

Transmitted Via Electronic Mail

April 1, 2016

Ms. Alice Yeh
Remedial Project Manager
U.S. Environmental Protection Agency, Region II
Emergency and Remedial Response Division
290 Broadway, 19th Floor
New York, NY 10007-1866

Re: Combined Sewer Overflow/Stormwater Outfall Program Total TCDD Verification Memorandum

Dear Ms. Yeh:

Please find enclosed *CSO/SWO Total TCDD Verification Memorandum, Revision 1* dated April 2016 and prepared in accordance with Worksheet #36 of the Combined Sewer Overflow (CSO) / Stormwater Outfall (SWO) Quality Assurance Project Plan (QAPP). Revision 1 of this memorandum incorporates changes resulting from comments contained in the following documents:

- *Phase I Data Usability Report Aug. 2014- EPA Comments* - USEPA provided initial comments on the DQUAR on August 6th, 2015.
- *Tierra Responses to USEPA Comments on DQUAR_Final 09.18.15* – Tierra submitted a Response to Comment (RTC) document on September 18, 2015, which provided responses to USEPA comments received on August 6th, 2015.
- *CDM Smith Comments_CS0-SWO Phase I Tierra Response to Comments* – CDM Smith (EPA Contractor) submitted final comments to the DQUAR on November 12, 2015.

By submittal of this memorandum, Tierra is not subscribing to the usefulness of the estimated Total TCDD value for reasons previously discussed and presented to USEPA

If you have any questions regarding the attached report, please feel free to contact me at 732-246-5920.

Sincerely,



Brian Mikucki
Project Scientist
On behalf of Occidental Chemical Corporation

(as successor to Diamond Shamrock Chemicals Company)

Enclosures

Cc: Enrique Castro, Tierra Solutions, Inc.
Diane Waldschmidt, Environmental Data Services

TOTAL TETRACHLORINATED DIBENZO-P-DIOXIN MEMORANDUM
Revision 1
March 30, 2016

SITE: CSO/SWO Phase I

SAMPLE DELIVERY GROUPS: PR101, PR102, PR105, PR106, PR-107, PR109, PR110, PR125, PR126, PR127, PR134, PR135, PR137, PR138, PR140, PR141, PR142, PR145, PR146, PR147, PR149, PR150

A total of 53 samples were collected and submitted to Vista Analytical Laboratory for analysis in support of Phase I of Tierra's Combined Sewer Overflow/Stormwater Outfall Investigation (CSO/SWO). The samples were analyzed via USEPA method 1613B to determine the concentrations of 2,3,7,8-substituted polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDFs). The purpose of this reported is to summarize the findings upon completion of verification of total tetra chlorinated dibenzo-p-dioxin (TCDD) results reported for the CSO/SWO investigation.

The verification standard operating procedure "Verification of Total Tetra-Chlorinated Dibenzo-p- Dioxin Results", Rev. 2, 02/25/2016, was used to perform the total TCDD verification.

Note: Although results for other total dibenzo-p-dioxins (chlorinated levels penta, hexa and hepta) as well as dibenzo furans (chlorination levels tetra through hepta) reside in the existing database for these sample delivery groups, they have not been reviewed using the above mentioned procedure, nor have they been checked for potential transcription error.

No analyte concentration is guaranteed to be accurate even if all associated quality control is acceptable. While strict quality control conformance provides well-defined confidence in the reported results, any analytical result will always contain some uncertainty as documented in the laboratory control limits.

The user is cautioned that the validation effort is based on the materials provided by the laboratory. Software manipulation, resulting in misleading raw data printouts, cannot be routinely detected during verification; unless otherwise stated in the report, these kinds of issues are outside the scope of this review.

Appendix A contains a cross reference table of the sample identifiers, sample delivery group and sample collection method listing the samples for which total TCDD verification was performed. Appendix B contains revised verified Form Is. Appendix C contains TCDD verification worksheets and sample calculation.



Terri Solomon
Senior Technical Specialist

Date: March 8, 2016



5 Brilliant Avenue, Pittsburgh, PA 15215
412.408.3288 | www.eds-pa.com

Verification Procedure

This verification procedure was implemented as an evaluation of total TCDD results since these values were not evaluated during the isomer specific data validation task. This process is used to assess both the completeness and accuracy of the total TCDD data set.

Total TCDD results were verified for each sample having total TCDD results reported in Phase I of the CSO/SWO Investigation. In cases where multiple analyses were performed by the laboratory for 2,3,7,8-TCDD (example: multiple dilutions due to elevated target analyte concentrations or re-analysis based on failed quality control criteria), EDS confirmed that the total TCDD value reported in the data base, as well as hardcopy data, was based on the same analysis used to derive the 2,3,7,8-TCDD value reported.

Procedure Acceptance Criteria for Verification of Total Tetra Chlorinated Dibenzo Dioxin:

- Selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin are reported for each sample.
- Integrated areas are present for both the primary and confirmation ions for all peaks, and are 2.5 times above background noise in each sample SICIP.
- Instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information are present for each sample.

Calculation Acceptance Criteria for Verification of Total Tetra Chlorinated Dibenzo Dioxin:

- The retention time of each non 2,3,7,8-substituted compound identified as present in the sample was within the window established by the window defining mixture, for the tetra chlorinated homologue.
- The integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample was at least 2.5 times background noise.
- All peaks meeting the requirements described above were included in the laboratory's calculation of Total TCDD.
- A minimum of one non 2,3,7,8-substituted compound identified was verified and the concentration recalculated.
- Recalculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample.

Results of Verification:

All 53 total TCDD results, reported during implementation of the Phase I CSO/SWO Investigation, were evaluated during this task. Of the 53 samples evaluated for this program, four results are recommended for editing based on the results of the total TCDD result verification task. The affected samples and associated results are provided in the Table 1 below. Total TCDD results for these samples have been corrected in both the laboratory hardcopy data reports and United States Environmental Protection Agency (USEPA) Region 2 Main Electronic Data Deliverable (MEDD)

Table 1

Sample Identification	Result Units	Existing Result Value	Data Qualifiers	New Result Value	Data Qualifiers
PR1LPDUP-01A	pg/g	11.5	EMPC	9.72	EMPC
PR1CSOCLYHP-02B	pg/g	14.0		12.8	
PR1HPDUP-02B	pg/g	13.8	EMPC	12.1	EMPC
PR1CSOCLYHP-01C	pg/g	19.4	EMPC	17.8	EMPC

Appendix A

Dioxin Samples collected in the CSO/SWO Phase I Sampling Event			
Sampling Method	Blank	SDG	Sample ID
	Rinse Blank	PR101	PR101CFRB
			PR101TLC
			PR101CFFB
			PR101WWFB
	Rinse Blank	PR102	PR101LDEB (Primary)
			PR101LPEB (Primary)
			PR101LDEB (Secondary)
			PR101LPEB (Secondary)
Whole Water		PR105	PR1CSOCLYWW-01A
			PR1WWDUP-01A
HSM Particulate		PR106	PR1CSOCLYHP-01A
			PR1HPDUP-01A
HSM Dissolved		PR107	PR1CSOCLYHD-01A
			PR1HDDUP-01A
LSM Particulate		PR109	PR1CSOCLYLP-01A
			PR1LPDUP-01A
LSM Dissolved		PR110	PR1CSOCLYLD-01A
			PR1LDDUP-01A
	Rinse Blank	PR125	PR103WWFB
			PR108CFFB
			PR107CFRB
	Rinse Blank	PR126	PR103LPEB (Primary)
			PR103LDEB (Primary)
			PR103LPEB (Secondary)
			PR103LDEB (Secondary)
	Rinse Blank	PR127	PR108CFRB
Whole Water		PR134	PR1CSOCLYWW-02B
			PR1WWDUP-02B
HSM Particulate		PR135	PR1CSOCLYHP-02B
			PR1HPDUP-02B
	Rinse Blank	PR137	PR109CFRB
			PR101HLLC
HSM Dissolved		PR138	PR1CSOCLYHD-02B
			PR1HDDUP-02B
LSM Particulate		PR140	PR1CSOCLYLP-02B
			PR1LPDUP-02B
LSM Dissolved		PR141	PR1CSOCLYLD-02B
			PR1LDDUP-02B
	Rinse Blank	PR142	PR110CFRB
			PR109CFFB
			PR104WWFB
Whole Water		PR145	PR1CSOCLYWW-01C
			PR1WWDUP-01C
HSM Particulate		PR146	PR1CSOCLYHP-01C
			PR1HPDUP-01C
HSM Dissolved		PR147	PR1CSOCLYHD-01C
			PR1HDDUP-01C
LSM Particulate		PR149	PR1CSOCLYLP-01C
			PR1LPDUP-01C
	Rinse Blank		PR105LPEB
LSM Dissolved		PR150	PR1CSOCLYLD-01C
			PR1LDDUP-01C
	Rinse Blank		PR105LDEB

Appendix B

Sample ID: PR101CFRB				EPA Method 1613				
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	34128-001	Date Received:	14-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	10.2 L	QC Batch No.:	4877	Date Extracted:	26-Nov-12
Date Collected:	12-Nov-12				Date Analyzed DB-5:	28-Nov-12	Date Analyzed DB-225:	NA
Time Collected:	1150							
Analyte	Conc. (pg/L)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	0.137			G	IS 13C-2,3,7,8-TCDD	86.3	25 - 164	
1,2,3,7,8-PeCDD	ND	0.134			13C-1,2,3,7,8-PeCDD	67.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.164			13C-1,2,3,4,7,8-HxCDD	69.8	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.199			13C-1,2,3,6,7,8-HxCDD	67.9	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.203			13C-1,2,3,7,8,9-HxCDD	66.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.285			13C-1,2,3,4,6,7,8-HpCDD	59.4	23 - 140	
OCDD	0.539			G	13C-OCDD	51.8	17 - 157	
2,3,7,8-TCDF	ND	0.0760			13C-2,3,7,8-TCDF	92.4	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0630			13C-1,2,3,7,8-PeCDF	63.4	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0630			13C-2,3,4,7,8-PeCDF	75.0	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0997			13C-1,2,3,4,7,8-HxCDF	69.0	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0956			13C-1,2,3,6,7,8-HxCDF	67.2	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.110			13C-2,3,4,6,7,8-HxCDF	69.9	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.161			13C-1,2,3,7,8,9-HxCDF	63.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	0.327			G	13C-1,2,3,4,6,7,8-HpCDF	59.5	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.193			13C-1,2,3,4,7,8,9-HpCDF	59.5	26 - 138	
OCDF	1.06			G	13C-OCDF	53.5	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	88.7	35 - 197	
Totals					Toxic Equivalent Quotient (TEQ) Data ^e			
Total TCDD	0.137			B	TEQ (Min):	0.141		
Total PeCDD	ND	0.134						
Total HxCDD	ND	0.203						
Total HpCDD	ND	0.285						
Total TCDF	ND	0.0760						
Total PeCDF	ND	0.0630						
Total HxCDF	ND	0.161						
Total HpCDF	0.327							
					a. Sample specific estimated detection limit.			
					b. Estimated maximum possible concentration.			
					c. Method detection limit.			
					d. Lower control limit - upper control limit.			
					e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO)			

Analyst: MAS

Approved By: Calvin Tanaka 10-Dec-2012 12:20

TS
2/26/2016

Sample ID: PR101TLC				EPA Method 1613				
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	34129-001	Date Received:	14-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	9.74 L	QC Batch No.:	4877	Date Extracted:	26-Nov-12
Date Collected:	12-Nov-12				Date Analyzed DB-5:	28-Nov-12	Date Analyzed DB-225:	NA
Time Collected:	0815							
Analyte	Conc. (pg/L)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	0.0578	G		IS 13C-2,3,7,8-TCDD	94.1	25 - 164	
1,2,3,7,8-PeCDD	ND	0.101			13C-1,2,3,7,8-PeCDD	82.5	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.145			13C-1,2,3,4,7,8-HxCDD	79.9	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.162			13C-1,2,3,6,7,8-HxCDD	82.1	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.178			13C-1,2,3,7,8,9-HxCDD	76.7	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.247			13C-1,2,3,4,6,7,8-HpCDD	67.9	23 - 140	
OCDD	0.315				13C-OCDD	61.3	17 - 157	
2,3,7,8-TCDF	ND	0.0669			13C-2,3,7,8-TCDF	97.0	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0562			13C-1,2,3,7,8-PeCDF	73.0	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0535			13C-2,3,4,7,8-PeCDF	87.0	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0809			13C-1,2,3,4,7,8-HxCDF	78.2	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0783			13C-1,2,3,6,7,8-HxCDF	78.0	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0846			13C-2,3,4,6,7,8-HxCDF	82.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.124			13C-1,2,3,7,8,9-HxCDF	73.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.112			13C-1,2,3,4,6,7,8-HpCDF	68.4	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.129			13C-1,2,3,4,7,8,9-HpCDF	67.1	26 - 138	
OCDF	ND	0.231			13C-OCDF	61.6	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	93.0	35 - 197	
Totals					Toxic Equivalent Quotient (TEQ) Data ^e			
Total TCDD	ND	0.0578	TEQ (Min): 0.0000945					
Total PeCDD	ND	0.101						
Total HxCDD	ND	0.178						
Total HpCDD	ND	0.247						
Total TCDF	ND	0.0669						
Total PeCDF	ND	0.0562						
Total HxCDF	ND	0.124						
Total HpCDF	ND	0.129						

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO)

Analyst: MAS

Approved By: William J. Luksemburg 04-Dec-2012 13:29

TLS
2/26/2016

Sample ID: PR101CFFB				EPA Method 1613				
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	34130-001	Date Received:	14-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	9.45 L	QC Batch No.:	4877	Date Extracted:	26-Nov-12
Date Collected:	13-Nov-12				Date Analyzed DB-5:	28-Nov-12	Date Analyzed DB-225:	NA
Time Collected:	1300							
Analyte	Conc. (pg/L)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	0.0675			IS 13C-2,3,7,8-TCDD	94.7	25 - 164	
1,2,3,7,8-PeCDD	ND	0.114			13C-1,2,3,7,8-PeCDD	76.7	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.192			13C-1,2,3,4,7,8-HxCDD	69.0	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.210			13C-1,2,3,6,7,8-HxCDD	69.9	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.212			13C-1,2,3,7,8,9-HxCDD	66.8	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.288			13C-1,2,3,4,6,7,8-HpCDD	54.0	23 - 140	
OCDD	ND	0.325			13C-OCDD	45.8	17 - 157	
2,3,7,8-TCDF	ND	0.0742			13C-2,3,7,8-TCDF	96.8	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0646			13C-1,2,3,7,8-PeCDF	68.2	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0626			13C-2,3,4,7,8-PeCDF	81.8	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.108			13C-1,2,3,4,7,8-HxCDF	67.4	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.109			13C-1,2,3,6,7,8-HxCDF	65.8	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.120			13C-2,3,4,6,7,8-HxCDF	71.2	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.170			13C-1,2,3,7,8,9-HxCDF	64.6	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.141			13C-1,2,3,4,6,7,8-HpCDF	54.3	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.172			13C-1,2,3,4,7,8,9-HpCDF	52.8	26 - 138	
OCDF	ND		0.240		13C-OCDF	46.4	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	90.3	35 - 197	
Totals				Toxic Equivalent Quotient (TEQ) Data ^e				
Total TCDD	ND	0.0675			TEQ (Min): 0			
Total PeCDD	ND	0.114						
Total HxCDD	ND	0.212						
Total HpCDD	ND	0.288						
Total TCDF	ND	0.0742						
Total PeCDF	ND	0.0646						
Total HxCDF	ND	0.170						
Total HpCDF	ND	0.172						
					^a Sample specific estimated detection limit.			
					^b Estimated maximum possible concentration.			
					^c Method detection limit.			
					^d Lower control limit - upper control limit.			
					^e TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO)			

- a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO)

Analyst: MAS

Approved By: William J. Luksemburg 04-Dec-2012 13:29

TS
2/26/2016

Sample ID: PR101WWFB				EPA Method 1613				
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	34131-001	Date Received:	14-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	9.36 L	QC Batch No.:	4877	Date Extracted:	26-Nov-12
Date Collected:	13-Nov-12				Date Analyzed DB-5:	28-Nov-12	Date Analyzed DB-225:	NA
Time Collected:	0900							
Analyte	Conc. (pg/L)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	0.0613			IS 13C-2,3,7,8-TCDD	92.3	25 - 164	
1,2,3,7,8-PeCDD	ND	0.112			13C-1,2,3,7,8-PeCDD	78.7	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.159			13C-1,2,3,4,7,8-HxCDD	77.8	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.193			13C-1,2,3,6,7,8-HxCDD	76.8	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.199			13C-1,2,3,7,8,9-HxCDD	75.3	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.288			13C-1,2,3,4,6,7,8-HpCDD	65.3	23 - 140	
OCDD	ND	0.270			13C-OCDD	61.6	17 - 157	
2,3,7,8-TCDF	ND	0.0746			13C-2,3,7,8-TCDF	96.8	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0526			13C-1,2,3,7,8-PeCDF	72.4	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0522			13C-2,3,4,7,8-PeCDF	84.9	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0779			13C-1,2,3,4,7,8-HxCDF	77.2	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0785			13C-1,2,3,6,7,8-HxCDF	74.7	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0898			13C-2,3,4,6,7,8-HxCDF	78.6	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.118			13C-1,2,3,7,8,9-HxCDF	73.8	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.113			13C-1,2,3,4,6,7,8-HpCDF	65.5	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.138			13C-1,2,3,4,7,8,9-HpCDF	64.4	26 - 138	
OCDF	ND	0.242			13C-OCDF	62.9	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	89.6	35 - 197	
Totals				Toxic Equivalent Quotient (TEQ) Data ^e				
Total TCDD	ND	0.0613			TEQ (Min): 0			
Total PeCDD	ND	0.112						
Total HxCDD	ND	0.199						
Total HpCDD	ND	0.288						
Total TCDF	ND	0.0746						
Total PeCDF	ND	0.0526						
Total HxCDF	ND	0.118						
Total HpCDF	ND	0.138						

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

Analyst: MAS

Approved By: William J. Luksemburg 04-Dec-2012 13:30

TS
2/26/2016

Sample ID: PR101LDEB(Primary)				EPA Method 1613				
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	34145-003	Date Received:	21-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	9.56 L	QC Batch No.:	4909	Date Extracted:	10-Dec-12
Date Collected:	19-Nov-12				Date Analyzed DB-5:	13-Dec-12	Date Analyzed DB-225:	NA
Time Collected:	1140							
Analyte	Conc. (pg/L)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	0.0806			IS 13C-2,3,7,8-TCDD	78.2	25 - 164	
1,2,3,7,8-PeCDD	ND	0.191			13C-1,2,3,7,8-PeCDD	61.2	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.172			13C-1,2,3,4,7,8-HxCDD	61.8	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.198			13C-1,2,3,6,7,8-HxCDD	69.8	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.231			13C-1,2,3,7,8,9-HxCDD	61.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.398			13C-1,2,3,4,6,7,8-HpCDD	46.2	23 - 140	
OCDD	ND	0.391			13C-OCDD	41.5	17 - 157	
2,3,7,8-TCDF	ND	0.0896			13C-2,3,7,8-TCDF	84.3	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0755			13C-1,2,3,7,8-PeCDF	57.6	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0729			13C-2,3,4,7,8-PeCDF	70.6	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0983			13C-1,2,3,4,7,8-HxCDF	61.2	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0950			13C-1,2,3,6,7,8-HxCDF	62.5	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0985			13C-2,3,4,6,7,8-HxCDF	68.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.159			13C-1,2,3,7,8,9-HxCDF	56.9	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.149			13C-1,2,3,4,6,7,8-HpCDF	51.4	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.211			13C-1,2,3,4,7,8,9-HpCDF	45.2	26 - 138	
OCDF	ND	0.376			13C-OCDF	42.4	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	91.8	35 - 197	
Totals				Toxic Equivalent Quotient (TEQ) Data ^e				
Total TCDD	ND	0.0806			TEQ (Min):	0		
Total PeCDD	ND	0.191			a. Sample specific estimated detection limit.			
Total HxCDD	ND	0.231			b. Estimated maximum possible concentration.			
Total HpCDD	ND	0.398			c. Method detection limit.			
Total TCDF	ND	0.0896			d. Lower control limit - upper control limit.			
Total PeCDF	ND	0.0755			e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO)			
Total HxCDF	ND	0.159						
Total HpCDF	ND	0.211						

Analyst: ANP

Approved By: William J. Luksemburg 15-Dec-2012 07:48

TZ
2/26/16

Sample ID: PR101LDEB(Secondary)				EPA Method 1613				
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	34145-001	Date Received:	20-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	8.97 L	QC Batch No.:	4909	Date Extracted:	10-Dec-12
Date Collected:	16-Nov-12				Date Analyzed DB-5:	12-Dec-12	Date Analyzed DB-225:	NA
Time Collected:	1236							
Analyte	Conc. (pg/L)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	0.137			IS 13C-2,3,7,8-TCDD	73.4	25 - 164	
1,2,3,7,8-PeCDD	ND	0.221			13C-1,2,3,7,8-PeCDD	66.1	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.214			13C-1,2,3,4,7,8-HxCDD	61.9	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.243			13C-1,2,3,6,7,8-HxCDD	64.8	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.276			13C-1,2,3,7,8,9-HxCDD	59.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.459			13C-1,2,3,4,6,7,8-HpCDD	52.6	23 - 140	
OCDD	ND	0.370			13C-OCDD	45.6	17 - 157	
2,3,7,8-TCDF	ND	0.159			13C-2,3,7,8-TCDF	81.9	24 - 169	
1,2,3,7,8-PeCDF	ND	0.132			13C-1,2,3,7,8-PeCDF	59.6	24 - 185	
2,3,4,7,8-PeCDF	ND	0.118			13C-2,3,4,7,8-PeCDF	74.8	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.122			13C-1,2,3,4,7,8-HxCDF	62.8	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.125			13C-1,2,3,6,7,8-HxCDF	60.8	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.141			13C-2,3,4,6,7,8-HxCDF	66.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.203			13C-1,2,3,7,8,9-HxCDF	58.8	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.141			13C-1,2,3,4,6,7,8-HpCDF	53.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.206			13C-1,2,3,4,7,8,9-HpCDF	49.1	26 - 138	
OCDF	ND	0.468			13C-OCDF	47.2	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	100	35 - 197	
Totals					Toxic Equivalent Quotient (TEQ) Data ^e			
Total TCDD	ND	0.137			TEQ (Min): 0			
Total PeCDD	ND	0.221						
Total HxCDD	ND	0.276						
Total HpCDD	ND	0.459						
Total TCDF	ND	0.159						
Total PeCDF	ND	0.132						
Total HxCDF	ND	0.203						
Total HpCDF	ND	0.206						

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO)

Analyst: ANP

Approved By: William J. Luksemburg 15-Dec-2012 07:48

TS
2/26/16

Sample ID: PR101LPEB(Primary)					EPA Method 1613			
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Solid	Lab Sample:	34145-004	Date Received:	21-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	Sample	QC Batch No.:	4906	Date Extracted:	6-Dec-12
Date Collected:	19-Nov-12				Date Analyzed DB-5:	7-Dec-12	Date Analyzed DB-225:	NA
Time Collected:	1140							
Analyte	Conc. (pg/sample)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	2.05			IS 13C-2,3,7,8-TCDD	89.4	25 - 164	
1,2,3,7,8-PeCDD	ND	2.17			13C-1,2,3,7,8-PeCDD	113	25 - 181	
1,2,3,4,7,8-HxCDD	ND	1.99			13C-1,2,3,4,7,8-HxCDD	80.7	32 - 141	
1,2,3,6,7,8-HxCDD	ND	2.07			13C-1,2,3,6,7,8-HxCDD	94.7	28 - 130	
1,2,3,7,8,9-HxCDD	ND	2.42			13C-1,2,3,7,8,9-HxCDD	86.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	3.85			13C-1,2,3,4,6,7,8-HpCDD	93.8	23 - 140	
OCDD	ND	6.06			13C-OCDD	112	17 - 157	
2,3,7,8-TCDF	ND	0.950			13C-2,3,7,8-TCDF	88.4	24 - 169	
1,2,3,7,8-PeCDF	ND	1.62			13C-1,2,3,7,8-PeCDF	98.5	24 - 185	
2,3,4,7,8-PeCDF	ND	1.50			13C-2,3,4,7,8-PeCDF	116	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.716			13C-1,2,3,4,7,8-HxCDF	82.4	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.691			13C-1,2,3,6,7,8-HxCDF	88.8	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.783			13C-2,3,4,6,7,8-HxCDF	88.1	28 - 136	
1,2,3,7,8,9-HxCDF	ND	1.12			13C-1,2,3,7,8,9-HxCDF	84.0	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	1.19			13C-1,2,3,4,6,7,8-HpCDF	87.9	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	1.60			13C-1,2,3,4,7,8,9-HpCDF	97.1	26 - 138	
OCDF	ND	2.36			13C-OCDF	110	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	86.2	35 - 197	
Totals					Toxic Equivalent Quotient (TEQ) Data^e			
Total TCDD	ND	2.05			TEQ (Min): 0			
Total PeCDD	ND	2.17			a. Sample specific estimated detection limit. b. Estimated maximum possible concentration. c. Method detection limit. d. Lower control limit - upper control limit. e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors.(WHO) The results are reported in dry weight. The sample size is reported in wet weight.			
Total HxCDD	ND	2.16						
Total HpCDD	ND	3.85						
Total TCDF	ND	0.950						
Total PeCDF	ND	1.55						
Total HxCDF	ND	0.813						
Total HpCDF	ND	1.35						

Analyst: DMS

Approved By: William J. Luksemburg 12-Dec-2012 11:48

TS
2/26/16

Sample ID: PR101LPEB(Secondary)					EPA Method 1613			
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Solid	Lab Sample:	34145-002	Date Received:	20-Nov-12
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	Sample	QC Batch No.:	4907	Date Extracted:	6-Dec-12
Date Collected:	16-Nov-12				Date Analyzed DB-5:	8-Dec-12	Date Analyzed DB-225:	NA
Time Collected:	1236							
Analyte	Conc. (pg/sample)	DL ^a	EMPC ^b	Qualifiers	Labeled Standard	%R	LCL-UCL ^d	Qualifiers
2,3,7,8-TCDD	ND	2.51			IS 13C-2,3,7,8-TCDD	85.7	25 - 164	
1,2,3,7,8-PeCDD	ND	2.57			13C-1,2,3,7,8-PeCDD	92.4	25 - 181	
1,2,3,4,7,8-HxCDD	ND	3.03			13C-1,2,3,4,7,8-HxCDD	78.4	32 - 141	
1,2,3,6,7,8-HxCDD	ND	3.07			13C-1,2,3,6,7,8-HxCDD	92.9	28 - 130	
1,2,3,7,8,9-HxCDD	ND	3.84			13C-1,2,3,7,8,9-HxCDD	86.7	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	5.27			13C-1,2,3,4,6,7,8-HpCDD	88.9	23 - 140	
OCDD	ND	9.25			13C-OCDD	105	17 - 157	
2,3,7,8-TCDF	ND	1.39			13C-2,3,7,8-TCDF	83.7	24 - 169	
1,2,3,7,8-PeCDF	ND	1.83			13C-1,2,3,7,8-PeCDF	90.9	24 - 185	
2,3,4,7,8-PeCDF	ND	1.75			13C-2,3,4,7,8-PeCDF	97.6	21 - 178	
1,2,3,4,7,8-HxCDF	ND	1.01			13C-1,2,3,4,7,8-HxCDF	77.3	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.941			13C-1,2,3,6,7,8-HxCDF	89.0	26 - 123	
2,3,4,6,7,8-HxCDF	ND	1.08			13C-2,3,4,6,7,8-HxCDF	84.9	28 - 136	
1,2,3,7,8,9-HxCDF	ND	1.47			13C-1,2,3,7,8,9-HxCDF	80.5	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	1.61			13C-1,2,3,4,6,7,8-HpCDF	88.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	2.35			13C-1,2,3,4,7,8,9-HpCDF	94.1	26 - 138	
OCDF	ND	3.78			13C-OCDF	103	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	79.5	35 - 197	
Totals					Toxic Equivalent Quotient (TEQ) Data^e			
Total TCDD	ND	2.50			TEQ (Min):	0		
Total PeCDD	ND	2.57			a. Sample specific estimated detection limit.			
Total HxCDD	ND	3.31			b. Estimated maximum possible concentration.			
Total HpCDD	ND	5.26			c. Method detection limit.			
Total TCDF	ND	1.38			d. Lower control limit - upper control limit.			
Total PeCDF	ND	1.79			e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)			
Total HxCDF	ND	1.11			The results are reported in dry weight. The sample size is reported in wet weight.			
Total HpCDF	ND	1.90						

Analyst: DMS

Approved By: William J. Luksemburg 12-Dec-2012 11:48

TS
2/26/16

Sample ID: PR1CSOCLYWW-01A

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 10-Jun-2013 20:55

Sample Data

Matrix: Aqueous
 Sample Size: 7.23 L

Laboratory Data

Lab Sample: 1300420-01 Date Received: 12-Jun-2013 9:27
 QC Batch: B3G0015 Date Extracted: 27-Jun-2013 7:41
 Date Analyzed: 08-Jul-13 21:12 Column: ZB-SMS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.386			IS 13C-2,3,7,8-TCDD	84.3	25 - 164	
1,2,3,7,8-PeCDD	ND	0.510			13C-1,2,3,7,8-PeCDD	108	25 - 181	
1,2,3,4,7,8-HxCDD	0.859			G	13C-1,2,3,4,7,8-HxCDD	52.2	32 - 141	
1,2,3,6,7,8-HxCDD	2.37			G	13C-1,2,3,6,7,8-HxCDD	53.6	28 - 130	
1,2,3,7,8,9-HxCDD	1.56			G	13C-1,2,3,7,8,9-HxCDD	53.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	62.1				13C-1,2,3,4,6,7,8-HpCDD	79.6	23 - 140	
OCDD	715				13C-OCDD	75.5	17 - 157	
2,3,7,8-TCDF	ND		0.173		13C-2,3,7,8-TCDF	79.7	24 - 169	
1,2,3,7,8-PeCDF	0.228			G	13C-1,2,3,7,8-PeCDF	86.9	24 - 185	
2,3,4,7,8-PeCDF	ND		0.302		13C-2,3,4,7,8-PeCDF	90.6	21 - 178	
1,2,3,4,7,8-HxCDF	1.68			G	13C-1,2,3,4,7,8-HxCDF	63.8	26 - 152	
1,2,3,6,7,8-HxCDF	ND		1.32		13C-1,2,3,6,7,8-HxCDF	64.6	26 - 123	
2,3,4,6,7,8-HxCDF	1.69			G	13C-2,3,4,6,7,8-HxCDF	65.9	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.356			13C-1,2,3,7,8,9-HxCDF	66.1	29 - 147	
1,2,3,4,6,7,8-HpCDF	18.0				13C-1,2,3,4,6,7,8-HpCDF	69.9	28 - 143	
1,2,3,4,7,8,9-HpCDF	1.56			G	13C-1,2,3,4,7,8,9-HpCDF	73.6	26 - 138	
OCDF	36.6				13C-OCDF	76.6	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	116	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 1.86

TOTALS

Total TCDD	0.240	0.923
Total PeCDD	5.96	6.20
Total HxCDD	17.2	18.5
Total HpCDD	128	
Total TCDF	2.95	3.79
Total PeCDF	7.39	7.82
Total HxCDF	24.7	26.4
Total HpCDF	39.3	

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Project 1300420

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 2/25/2016

Sample ID: PR1WWDUP-01A

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 10-Jun-2013 0:00

Sample Data

Matrix: Aqueous
 Sample Size: 9.50 L

Laboratory Data

Lab Sample: 1300420-02 Date Received: 12-Jun-2013 9:27
 QC Batch: B3F0082 Date Extracted: 27-Jun-2013 7:41
 Date Analyzed: 03-Jul-13 17:50 Column: ZB-5MS Analyst: ANP

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0516			IS 13C-2,3,7,8-TCDD	61.9	25 - 164	
1,2,3,7,8-PeCDD	ND		0.211		13C-1,2,3,7,8-PeCDD	55.5	25 - 181	
1,2,3,4,7,8-HxCDD	0.514			G	13C-1,2,3,4,7,8-HxCDD	63.5	32 - 141	
1,2,3,6,7,8-HxCDD	1.41			G	13C-1,2,3,6,7,8-HxCDD	65.2	28 - 130	
1,2,3,7,8,9-HxCDD	1.18			G	13C-1,2,3,7,8,9-HxCDD	62.3	32 - 141	
1,2,3,4,6,7,8-HpCDD	41.3				13C-1,2,3,4,6,7,8-HpCDD	48.5	23 - 140	
OCDD	429				13C-OCDD	39.7	17 - 157	
2,3,7,8-TCDF	ND		0.210		13C-2,3,7,8-TCDF	45.8	24 - 169	
1,2,3,7,8-PeCDF	ND		0.188		13C-1,2,3,7,8-PeCDF	58.5	24 - 185	
2,3,4,7,8-PeCDF	0.248			G	13C-2,3,4,7,8-PeCDF	59.7	21 - 178	
1,2,3,4,7,8-HxCDF	1.33			G	13C-1,2,3,4,7,8-HxCDF	62.5	26 - 152	
1,2,3,6,7,8-HxCDF	1.29			G	13C-1,2,3,6,7,8-HxCDF	67.8	26 - 123	
2,3,4,6,7,8-HxCDF	1.39			G	13C-2,3,4,6,7,8-HxCDF	66.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.309			13C-1,2,3,7,8,9-HxCDF	58.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	20.5				13C-1,2,3,4,6,7,8-HpCDF	51.7	28 - 143	
1,2,3,4,7,8,9-HpCDF	1.56			G	13C-1,2,3,4,7,8,9-HpCDF	47.6	26 - 138	
OCDF	43.2				13C-OCDF	39.2	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	71.0	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 1.56

TOTALS

Total TCDD 0.357
 Total PeCDD 2.21
 Total HxCDD 12.1
 Total HpCDD 80.9
 Total TCDF 2.85
 Total PeCDF 9.55
 Total HxCDF 24.7
 Total HpCDF 42.3

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL: Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR1CSOCLYHP-01A

EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Solid	Lab Sample:	1300419-01	Date Received: 13-Jun-2013 9:42
Project:	Lower Passaic River Study CSO/SWO	Sample Size:	17.3 g	QC Batch:	B3F0052	Date Extracted: 19-Jun-2013 14:38
Date Collected:	10-Jun-2013 20:55	% Solids:	29.5	Date Analyzed:	25-Jun-13 22:06	Column: ZB-5MS Analyst: MAS
				28-Jun-13 16:52 Column: DB-225 Analyst: MAS		

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	2.36				IS 13C-2,3,7,8-TCDD	90.8	25 - 164	
1,2,3,7,8-PeCDD	4.34				13C-1,2,3,7,8-PeCDD	96.8	25 - 181	
1,2,3,4,7,8-HxCDD	5.96				13C-1,2,3,4,7,8-HxCDD	84.2	32 - 141	
1,2,3,6,7,8-HxCDD	21.4				13C-1,2,3,6,7,8-HxCDD	81.1	28 - 130	
1,2,3,7,8,9-HxCDD	15.3				13C-1,2,3,7,8,9-HxCDD	83.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	672				13C-1,2,3,4,6,7,8-HpCDD	95.4	23 - 140	
OCDD	9480			D	13C-OCDD	112	17 - 157	D
2,3,7,8-TCDF	4.76				13C-2,3,7,8-TCDF	92.6	24 - 169	
1,2,3,7,8-PeCDF	3.76				13C-1,2,3,7,8-PeCDF	105	24 - 185	
2,3,4,7,8-PeCDF	4.76				13C-2,3,4,7,8-PeCDF	101	21 - 178	
1,2,3,4,7,8-HxCDF	20.9				13C-1,2,3,4,7,8-HxCDF	84.4	26 - 152	
1,2,3,6,7,8-HxCDF	15.4				13C-1,2,3,6,7,8-HxCDF	77.0	26 - 123	
2,3,4,6,7,8-HxCDF	19.0				13C-2,3,4,6,7,8-HxCDF	80.0	28 - 136	
1,2,3,7,8,9-HxCDF	1.53			G	13C-1,2,3,7,8,9-HxCDF	83.2	29 - 147	
1,2,3,4,6,7,8-HpCDF	245				13C-1,2,3,4,6,7,8-HpCDF	82.9	28 - 143	
1,2,3,4,7,8,9-HpCDF	16.4				13C-1,2,3,4,7,8,9-HpCDF	93.7	26 - 138	
OCDF	486				13C-OCDF	98.3	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	96.8	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 31.0

TOTALS

Total TCDD	14.5	18.0
Total PeCDD	71.4	
Total HxCDD	172	
Total HpCDD	1430	
Total TCDF	78.4	80.8
Total PeCDF	147	
Total HxCDF	314	
Total HpCDF	529	

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight.

The sample size is reported in wet weight. Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Project 1300419

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Sample ID: PRIHPDUP-01A					EPA Method 1613B			
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Solid	Lab Sample:	1300419-02	Date Received:	13-Jun-2013 9:42
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	16.9 g	QC Batch:	B3F0052	Date Extracted:	19-Jun-2013 14:38
Date Collected:	10-Jun-2013 0:00		% Solids:	30.1	Date Analyzed :	25-Jun-13 21:18	Column: ZB-5MS	Analyst: MAS
						28-Jun-13 17:24	Column: DB-225	Analyst: MAS
Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	9.15				IS 13C-2,3,7,8-TCDD	97.2	25 - 164	
1,2,3,7,8-PeCDD	4.78				13C-1,2,3,7,8-PeCDD	104	25 - 181	
1,2,3,4,7,8-HxCDD	5.72				13C-1,2,3,4,7,8-HxCDD	79.5	32 - 141	
1,2,3,6,7,8-HxCDD	21.2				13C-1,2,3,6,7,8-HxCDD	80.5	28 - 130	
1,2,3,7,8,9-HxCDD	15.3				13C-1,2,3,7,8,9-HxCDD	81.3	32 - 141	
1,2,3,4,6,7,8-HpCDD	621				13C-1,2,3,4,6,7,8-HpCDD	93.6	23 - 140	
OCDD	8960			D	13C-OCDD	102	17 - 157	D
2,3,7,8-TCDF	4.90				13C-2,3,7,8-TCDF	97.6	24 - 169	
1,2,3,7,8-PeCDF	4.11				13C-1,2,3,7,8-PeCDF	106	24 - 185	
2,3,4,7,8-PeCDF	5.26				13C-2,3,4,7,8-PeCDF	107	21 - 178	
1,2,3,4,7,8-HxCDF	31.5				13C-1,2,3,4,7,8-HxCDF	82.7	26 - 152	
1,2,3,6,7,8-HxCDF	18.2				13C-1,2,3,6,7,8-HxCDF	75.3	26 - 123	
2,3,4,6,7,8-HxCDF	20.9				13C-2,3,4,6,7,8-HxCDF	77.8	28 - 136	
1,2,3,7,8,9-HxCDF	1.89			G	13C-1,2,3,7,8,9-HxCDF	80.8	29 - 147	
1,2,3,4,6,7,8-HpCDF	271				13C-1,2,3,4,6,7,8-HpCDF	81.7	28 - 143	
1,2,3,4,7,8,9-HpCDF	18.7				13C-1,2,3,4,7,8,9-HpCDF	92.4	26 - 138	
OCDF	549				13C-OCDF	90.7	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	100	35 - 197	
					Toxic Equivalent Quotient (TEQ) Data			
					TEQMinWHO2005Dioxin		39.6	
TOTALS								
Total TCDD	25.5		25.7					
Total PeCDD	57.2							
Total HxCDD	172							
Total HpCDD	1330							
Total TCDF	87.2		89.4					
Total PeCDF	163		164					
Total HxCDF	338							
Total HpCDF	562							

DL - Sample specific estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight. Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

TS
2/25/16

Sample ID: PRICSOCLYHD-01A

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 10-Jun-2013 20:55

Sample Data

Matrix: Aqueous
 Sample Size: 9.91 L

Laboratory Data

Lab Sample: 1300424-01 Date Received: 13-Jun-2013 9:42
 QC Batch: B3F0088 Date Extracted: 28-Jun-2013 7:22
 Date Analyzed: 03-Jul-13 19:30 Column: ZB-5MS Analyst: ANP

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		0.0670		IS 13C-2,3,7,8-TCDD	86.9	25 - 164	
1,2,3,7,8-PeCDD	0.182			G	13C-1,2,3,7,8-PeCDD	61.4	25 - 181	
1,2,3,4,7,8-HxCDD	0.347			G	13C-1,2,3,4,7,8-HxCDD	67.6	32 - 141	
1,2,3,6,7,8-HxCDD	1.19			G	13C-1,2,3,6,7,8-HxCDD	68.8	28 - 130	
1,2,3,7,8,9-HxCDD	0.894			G	13C-1,2,3,7,8,9-HxCDD	65.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	32.6				13C-1,2,3,4,6,7,8-HpCDD	51.7	23 - 140	
OCDD	365				13C-OCDD	42.4	17 - 157	
2,3,7,8-TCDF	0.148			G	13C-2,3,7,8-TCDF	77.7	24 - 169	
1,2,3,7,8-PeCDF	ND		0.101		13C-1,2,3,7,8-PeCDF	66.6	24 - 185	
2,3,4,7,8-PeCDF	0.266			G	13C-2,3,4,7,8-PeCDF	67.9	21 - 178	
1,2,3,4,7,8-HxCDF	0.982			G	13C-1,2,3,4,7,8-HxCDF	67.1	26 - 152	
1,2,3,6,7,8-HxCDF	0.962			G	13C-1,2,3,6,7,8-HxCDF	73.9	26 - 123	
2,3,4,6,7,8-HxCDF	1.04			G	13C-2,3,4,6,7,8-HxCDF	69.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.365			13C-1,2,3,7,8,9-HxCDF	62.5	29 - 147	
1,2,3,4,6,7,8-HpCDF	16.6				13C-1,2,3,4,6,7,8-HpCDF	54.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		1.29		13C-1,2,3,4,7,8,9-HpCDF	48.9	26 - 138	
OCDF	37.0				13C-OCDF	41.9	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	92.4	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 1.43

TOTALS

Total TCDD	ND	0.0670
Total PeCDD	2.33	
Total HxCDD	8.69	8.70
Total HpCDD	62.4	
Total TCDF	0.992	1.11
Total PeCDF	5.69	5.79
Total HxCDF	18.6	
Total HpCDF	34.7	36.0

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

TL5
2/25/16

Sample ID: PRIHDDUP-01A

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 10-Jun-2013 0:00

Sample Data

Matrix: Aqueous
 Sample Size: 9.88 L

Laboratory Data

Lab Sample: 1300424-02 Date Received: 13-Jun-2013 9:42
 QC Batch: B3F0088 Date Extracted: 28-Jun-2013 7:22
 Date Analyzed: 03-Jul-13 18:40 Column: ZB-5MS Analyst: ANP

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0740			IS 13C-2,3,7,8-TCDD	63.9	25 - 164	
1,2,3,7,8-PeCDD	ND	0.185			13C-1,2,3,7,8-PeCDD	50.5	25 - 181	
1,2,3,4,7,8-HxCDD	0.411			G	13C-1,2,3,4,7,8-HxCDD	57.9	32 - 141	
1,2,3,6,7,8-HxCDD	4.63				13C-1,2,3,6,7,8-HxCDD	59.4	28 - 130	
1,2,3,7,8,9-HxCDD	2.49			G	13C-1,2,3,7,8,9-HxCDD	56.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	116				13C-1,2,3,4,6,7,8-HpCDD	48.4	23 - 140	
OCDD	720				13C-OCDD	40.4	17 - 157	
2,3,7,8-TCDF	0.169			G	13C-2,3,7,8-TCDF	57.9	24 - 169	
1,2,3,7,8-PeCDF	0.139			G	13C-1,2,3,7,8-PeCDF	53.9	24 - 185	
2,3,4,7,8-PeCDF	0.248			G	13C-2,3,4,7,8-PeCDF	56.2	21 - 178	
1,2,3,4,7,8-HxCDF	0.912			G	13C-1,2,3,4,7,8-HxCDF	56.5	26 - 152	
1,2,3,6,7,8-HxCDF	1.04			G	13C-1,2,3,6,7,8-HxCDF	63.7	26 - 123	
2,3,4,6,7,8-HxCDF	0.922			G	13C-2,3,4,6,7,8-HxCDF	60.3	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.302			13C-1,2,3,7,8,9-HxCDF	53.6	29 - 147	
1,2,3,4,6,7,8-HpCDF	17.6				13C-1,2,3,4,6,7,8-HpCDF	47.3	28 - 143	
1,2,3,4,7,8,9-HpCDF	1.45			G	13C-1,2,3,4,7,8,9-HpCDF	44.2	26 - 138	
OCDF	39.8				13C-OCDF	38.7	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	90.9	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 2.71

TOTALS

Total TCDD	2.05			
Total PeCDD	31.1		31.3	
Total HxCDD	25.1			
Total HpCDD	193			
Total TCDF	0.668		0.770	
Total PeCDF	7.29		7.50	
Total HxCDF	18.7		18.9	
Total HpCDF	36.9			

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

TLS
 2/25/16

PR109

Sample ID: PRICSOCLYLP-01A					EPA Method 1613B			
Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Filter	Lab Sample:	1300432-01	Date Received:	19-Jun-2013 9:10
Project:	Lower Passaic River Study CSO/SWO		Sample Size:	0.371 g	QC Batch:	B3G0017	Date Extracted:	03-Jul-2013 10:33
Date Collected:	14-Jun-2013 10:20				Date Analyzed:	09-Jul-13 18:30	Column:	ZB-5MS Analyst: FEB
Analyte	Conc. (pg/Sample w	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	1.20			IS 13C-2,3,7,8-TCDD	98.6	25 - 164	
1,2,3,7,8-PeCDD	6.50			G	13C-1,2,3,7,8-PeCDD	98.2	25 - 181	
1,2,3,4,7,8-HxCDD	12.0			G	13C-1,2,3,4,7,8-HxCDD	88.6	32 - 141	
1,2,3,6,7,8-HxCDD	43.9				13C-1,2,3,6,7,8-HxCDD	87.2	28 - 130	
1,2,3,7,8,9-HxCDD	25.4				13C-1,2,3,7,8,9-HxCDD	87.3	32 - 141	
1,2,3,4,6,7,8-HpCDD	1940				13C-1,2,3,4,6,7,8-HpCDD	90.3	23 - 140	
OCDD	15700				13C-OCDD	87.4	17 - 157	
2,3,7,8-TCDF	5.49				13C-2,3,7,8-TCDF	93.8	24 - 169	
1,2,3,7,8-PeCDF	4.09			G	13C-1,2,3,7,8-PeCDF	99.3	24 - 185	
2,3,4,7,8-PeCDF	14.2			G	13C-2,3,4,7,8-PeCDF	97.8	21 - 178	
1,2,3,4,7,8-HxCDF	23.4				13C-1,2,3,4,7,8-HxCDF	97.3	26 - 152	
1,2,3,6,7,8-HxCDF	24.4				13C-1,2,3,6,7,8-HxCDF	98.4	26 - 123	
2,3,4,6,7,8-HxCDF	28.2				13C-2,3,4,6,7,8-HxCDF	96.7	28 - 136	
1,2,3,7,8,9-HxCDF	4.84			G	13C-1,2,3,7,8,9-HxCDF	97.5	29 - 147	
1,2,3,4,6,7,8-HpCDF	396				13C-1,2,3,4,6,7,8-HpCDF	97.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	28.1				13C-1,2,3,4,7,8,9-HpCDF	92.2	26 - 138	
OCDF	790				13C-OCDF	86.2	17 - 157	
TOTALS					CRS 37Cl-2,3,7,8-TCDD	103	35 - 197	
Total TCDD	18.6							
Total PeCDD	240							
Total HxCDD	354							
Total HpCDD	3860							
Total TCDF	71.5		92.9					
Total PeCDF	177		185					
Total HxCDF	496		499					
Total HpCDF	820							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

TS
2/26/16

Sample ID: PR1LPDUP-01A

EPA Method 1613B

Client Data		Sample Data		Laboratory Data				
Name:	Tierra Solutions, Inc.	Matrix:	Filter	Lab Sample:	1300432-02	Date Received:	19-Jun-2013 9:10	
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	0.612 g	QC Batch:	B3G0017	Date Extracted:	03-Jul-2013 10:33	
Date Collected:	14-Jun-2013 17:25			Date Analyzed :	09-Jul-13 21:01	Column: ZB-5MS	Analyst: FEB	
Analyte	Conc. (pg/Sample w	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	1.74			G	IS 13C-2,3,7,8-TCDD	100	25 - 164	
1,2,3,7,8-PeCDD	4.37			G	13C-1,2,3,7,8-PeCDD	101	25 - 181	
1,2,3,4,7,8-HxCDD	6.63			G	13C-1,2,3,4,7,8-HxCDD	94.9	32 - 141	
1,2,3,6,7,8-HxCDD	22.8			G	13C-1,2,3,6,7,8-HxCDD	93.1	28 - 130	
1,2,3,7,8,9-HxCDD	15.5			G	13C-1,2,3,7,8,9-HxCDD	93.3	32 - 141	
1,2,3,4,6,7,8-HpCDD	845				13C-1,2,3,4,6,7,8-HpCDD	92.1	23 - 140	
OCDD	8560				13C-OCDD	86.3	17 - 157	
2,3,7,8-TCDF	2.83			G	13C-2,3,7,8-TCDF	95.7	24 - 169	
1,2,3,7,8-PeCDF	3.14			G	13C-1,2,3,7,8-PeCDF	100	24 - 185	
2,3,4,7,8-PeCDF	8.37			G	13C-2,3,4,7,8-PeCDF	100	21 - 178	
1,2,3,4,7,8-HxCDF	13.3			G	13C-1,2,3,4,7,8-HxCDF	101	26 - 152	
1,2,3,6,7,8-HxCDF	14.0			G	13C-1,2,3,6,7,8-HxCDF	103	26 - 123	
2,3,4,6,7,8-HxCDF	15.8			G	13C-2,3,4,6,7,8-HxCDF	100	28 - 136	
1,2,3,7,8,9-HxCDF	4.55			G	13C-1,2,3,7,8,9-HxCDF	99.3	29 - 147	
1,2,3,4,6,7,8-HpCDF	215				13C-1,2,3,4,6,7,8-HpCDF	97.5	28 - 143	
1,2,3,4,7,8,9-HpCDF	16.2			G	13C-1,2,3,4,7,8,9-HpCDF	91.8	26 - 138	
OCDF	432				13C-OCDF	85.9	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	103	35 - 197	
TOTALS								
Total TCDD	10.5		11.5 9.72					
Total PeCDD	86.3		87.9					
Total HxCDD	172							
Total HpCDD	1730							
Total TCDF	51.0		54.5					
Total PeCDF	99.6							
Total HxCDF	270							
Total HpCDF	445							

DL - Sample specific estimated detection limit

LCL-UCL- Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

TS
2/26/16

Sample ID: PR1CSOCLYLD-01A

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 14-Jun-2013 10:20

Sample Data

Matrix: Aqueous
 Sample Size: 9.79 L

Laboratory Data

Lab Sample: 1300427-01 Date Received: 19-Jun-2013 9:10
 QC Batch: B3G0011 Date Extracted: 02-Jul-2013 7:44
 Date Analyzed: 04-Jul-13 17:53 Column: ZB-5MS Analyst: ANP

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0431			IS 13C-2,3,7,8-TCDD	66.2	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0938			13C-1,2,3,7,8-PeCDD	58.0	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.110			13C-1,2,3,4,7,8-HxCDD	47.0	32 - 141	
1,2,3,6,7,8-HxCDD	0.304			G	13C-1,2,3,6,7,8-HxCDD	51.0	28 - 130	
1,2,3,7,8,9-HxCDD	0.254			G	13C-1,2,3,7,8,9-HxCDD	46.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	6.33				13C-1,2,3,4,6,7,8-HpCDD	40.3	23 - 140	
OCDD	41.7				13C-OCDD	35.0	17 - 157	
2,3,7,8-TCDF	ND	0.0665			13C-2,3,7,8-TCDF	67.5	24 - 169	
1,2,3,7,8-PeCDF	ND		0.0380		13C-1,2,3,7,8-PeCDF	58.8	24 - 185	
2,3,4,7,8-PeCDF	0.0854			G	13C-2,3,4,7,8-PeCDF	61.3	21 - 178	
1,2,3,4,7,8-HxCDF	0.314			G	13C-1,2,3,4,7,8-HxCDF	47.0	26 - 152	
1,2,3,6,7,8-HxCDF	0.361			G	13C-1,2,3,6,7,8-HxCDF	49.1	26 - 123	
2,3,4,6,7,8-HxCDF	0.277			G	13C-2,3,4,6,7,8-HxCDF	48.6	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.203			13C-1,2,3,7,8,9-HxCDF	46.3	29 - 147	
1,2,3,4,6,7,8-HpCDF	3.40				13C-1,2,3,4,6,7,8-HpCDF	42.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		0.370		13C-1,2,3,4,7,8,9-HpCDF	39.6	26 - 138	
OCDF	6.05				13C-OCDF	34.8	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	95.7	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 0.288

TOTALS

Total TCDD	ND	0.0431		
Total PeCDD	0.158		0.276	
Total HxCDD	2.17		2.31	
Total HpCDD	11.6			
Total TCDF	0.102			
Total PeCDF	1.19		1.28	
Total HxCDF	4.52			
Total HpCDF	6.70		7.07	

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Project 1300427

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Sample ID: PRILDDUP-01A

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 14-Jun-2013 17:25

Sample Data

Matrix: Aqueous
 Sample Size: 9.71 L

Laboratory Data

Lab Sample: 1300427-02 Date Received: 19-Jun-2013 9:10
 QC Batch: B3G0011 Date Extracted: 02-Jul-2013 7:44
 Date Analyzed: 01-Jan-80 00:00 Column: ZB-5MS Analyst: ANP
 04-Jul-13 17:03 Column: ZB-5MS Analyst: ANP

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0521			IS 13C-2,3,7,8-TCDD	70.6	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0875			13C-1,2,3,7,8-PeCDD	60.4	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.138			13C-1,2,3,4,7,8-HxCDD	50.1	32 - 141	
1,2,3,6,7,8-HxCDD	0.313			G	13C-1,2,3,6,7,8-HxCDD	54.6	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.168			13C-1,2,3,7,8,9-HxCDD	51.4	32 - 141	
1,2,3,4,6,7,8-HpCDD	6.41				13C-1,2,3,4,6,7,8-HpCDD	44.2	23 - 140	
OCDD	44.0				13C-OCDD	39.4	17 - 157	
2,3,7,8-TCDF	ND	0.0679			13C-2,3,7,8-TCDF	70.9	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0605			13C-1,2,3,7,8-PeCDF	62.9	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0558			13C-2,3,4,7,8-PeCDF	65.2	21 - 178	
1,2,3,4,7,8-HxCDF	0.364			G	13C-1,2,3,4,7,8-HxCDF	50.0	26 - 152	
1,2,3,6,7,8-HxCDF	0.373			G	13C-1,2,3,6,7,8-HxCDF	52.4	26 - 123	
2,3,4,6,7,8-HxCDF	0.521			G	13C-2,3,4,6,7,8-HxCDF	51.4	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.122			13C-1,2,3,7,8,9-HxCDF	50.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	3.20				13C-1,2,3,4,6,7,8-HpCDF	46.2	28 - 143	
1,2,3,4,7,8,9-HpCDF	0.363			G	13C-1,2,3,4,7,8,9-HpCDF	44.5	26 - 138	
OCDF	5.90				13C-OCDF	38.9	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	99.2	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 0.252

TOTALS

Total TCDD	ND	0.0521	TS 2/26/16
Total PeCDD	ND	0.186	
Total HxCDD	2.00		
Total HpCDD	11.9		
Total TCDF	ND		
Total PeCDF	1.35		
Total HxCDF	4.64		
Total HpCDF	6.97		

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

TS
 2/26/16

Sample ID: PR107CFRB

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 07-Aug-2013 9:00

Sample Data

Matrix: Aqueous
 Sample Size: 10.0 L

Laboratory Data

Lab Sample: 1300551-03 Date Received: 08-Aug-2013 8:51
 QC Batch: B3H0058 Date Extracted: 22-Aug-2013 9:57
 Date Analyzed: 23-Aug-13 19:47 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		0.103		IS 13C-2,3,7,8-TCDD	93.8	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0459			13C-1,2,3,7,8-PeCDD	107	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.0861			13C-1,2,3,4,7,8-HxCDD	83.7	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.0895			13C-1,2,3,6,7,8-HxCDD	85.5	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.0872			13C-1,2,3,7,8,9-HxCDD	93.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.437			13C-1,2,3,4,6,7,8-HpCDD	105	23 - 140	
OCDD	0.502			G	13C-OCDD	98.4	17 - 157	
2,3,7,8-TCDF	ND	0.0647			13C-2,3,7,8-TCDF	94.4	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0719			13C-1,2,3,7,8-PeCDF	106	24 - 185	
2,3,4,7,8-PeCDF	ND	0.114			13C-2,3,4,7,8-PeCDF	109	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.230			13C-1,2,3,4,7,8-HxCDF	84.6	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0689			13C-1,2,3,6,7,8-HxCDF	80.4	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0849			13C-2,3,4,6,7,8-HxCDF	82.2	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0968			13C-1,2,3,7,8,9-HxCDF	94.1	29 - 147	
1,2,3,4,6,7,8-HpCDF	0.513			G	13C-1,2,3,4,6,7,8-HpCDF	90.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.109			13C-1,2,3,4,7,8,9-HpCDF	97.5	26 - 138	
OCDF	1.53			G	13C-OCDF	92.4	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	102	35 - 197	
					Toxic Equivalent Quotient (TEQ) Data			
					TEQMinWHO2005Dioxin	0.00574		
TOTALS								
Total TCDD	ND		0.168		EMF 2/26/16			
Total PeCDD	ND	0.112						
Total HxCDD	ND	0.148						
Total HpCDD	ND	0.437						
Total TCDF	ND	0.141						
Total PeCDF	ND	0.114						
Total HxCDF	ND	0.259						
Total HpCDF	0.513							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR108CFFB

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 07-Aug-2013 13:45

Sample Data

Matrix: Aqueous
 Sample Size: 10.1 L

Laboratory Data

Lab Sample: 1300551-02 Date Received: 08-Aug-2013 8:51
 QC Batch: B3H0058 Date Extracted: 22-Aug-2013 9:57
 Date Analyzed: 23-Aug-13 18:59 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.103			IS 13C-2,3,7,8-TCDD	83.0	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0437			13C-1,2,3,7,8-PeCDD	86.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.111			13C-1,2,3,4,7,8-HxCDD	70.2	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.122			13C-1,2,3,6,7,8-HxCDD	67.9	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.128			13C-1,2,3,7,8,9-HxCDD	66.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.393			13C-1,2,3,4,6,7,8-HpCDD	71.2	23 - 140	
OCDD	ND	0.466			13C-OCDD	64.3	17 - 157	
2,3,7,8-TCDF	ND	0.0424			13C-2,3,7,8-TCDF	88.8	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0508			13C-1,2,3,7,8-PeCDF	90.8	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0492			13C-2,3,4,7,8-PeCDF	95.1	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0523			13C-1,2,3,4,7,8-HxCDF	64.9	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0570			13C-1,2,3,6,7,8-HxCDF	63.1	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0314			13C-2,3,4,6,7,8-HxCDF	68.9	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0422			13C-1,2,3,7,8,9-HxCDF	68.0	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.125			13C-1,2,3,4,6,7,8-HpCDF	61.5	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0890			13C-1,2,3,4,7,8,9-HpCDF	67.4	26 - 138	
OCDF	ND	0.161			13C-OCDF	61.2	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	102	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 0.00

TOTALS

Total TCDD	ND	0.103		
Total PeCDD	ND	0.100		
Total HxCDD	ND	0.290		
Total HpCDD	ND	0.393		
Total TCDF	ND	0.0424		
Total PeCDF	ND	0.0529		
Total HxCDF	ND	0.0615		
Total HpCDF	ND	0.138		

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR103WWFB

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	1300551-01	Date Received:	08-Aug-2013 8:51
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	10.1 L	QC Batch:	B3H0058	Date Extracted:	22-Aug-2013 9:57
Date Collected:	07-Aug-2013 10:00				Date Analyzed :	23-Aug-13 18:10	Column:	ZB-5MS Analyst: MAS
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.104			IS 13C-2,3,7,8-TCDD	84.3	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0996			13C-1,2,3,7,8-PeCDD	95.2	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.0783			13C-1,2,3,4,7,8-HxCDD	75.6	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.0896			13C-1,2,3,6,7,8-HxCDD	72.6	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.0930			13C-1,2,3,7,8,9-HxCDD	73.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.135			13C-1,2,3,4,6,7,8-HpCDD	82.6	23 - 140	
OCDD	ND	0.993			13C-OCDD	69.8	17 - 157	
2,3,7,8-TCDF	ND	0.0479			13C-2,3,7,8-TCDF	87.3	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0533			13C-1,2,3,7,8-PeCDF	103	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0565			13C-2,3,4,7,8-PeCDF	102	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0713			13C-1,2,3,4,7,8-HxCDF	69.1	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0740			13C-1,2,3,6,7,8-HxCDF	66.1	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0519			13C-2,3,4,6,7,8-HxCDF	74.1	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0738			13C-1,2,3,7,8,9-HxCDF	72.2	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.109			13C-1,2,3,4,6,7,8-HpCDF	69.3	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0542			13C-1,2,3,4,7,8,9-HpCDF	78.8	26 - 138	
OCDF	ND	0.308			13C-OCDF	68.6	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	105	35 - 197	
					Toxic Equivalent Quotient (TEQ) Data			
					TEQMinWHO2005Dioxin	0.00		
TOTALS								
Total TCDD	ND	0.241			EMF 2/26/16			
Total PeCDD	ND	0.0996						
Total HxCDD	ND	0.134						
Total HpCDD	ND	0.239						
Total TCDF	ND	0.0479						
Total PeCDF	ND	0.0925						
Total HxCDF	ND	0.0824						
Total HpCDF	ND	0.116						

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR103LDEB (Primary)

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 08-Aug-2013 18:13

Sample Data

Matrix: Aqueous
 Sample Size: 10.2 L

Laboratory Data

Lab Sample: 1300565-01 Date Received: 13-Aug-2013 9:45
 QC Batch: B3H0058 Date Extracted: 22-Aug-2013 9:57
 Date Analyzed: 23-Aug-13 21:24 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0762			IS 13C-2,3,7,8-TCDD	64.8	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0893			13C-1,2,3,7,8-PeCDD	75.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.113			13C-1,2,3,4,7,8-HxCDD	63.7	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.129			13C-1,2,3,6,7,8-HxCDD	64.9	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.148			13C-1,2,3,7,8,9-HxCDD	61.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND		0.207		13C-1,2,3,4,6,7,8-HpCDD	80.3	23 - 140	
OCDD	0.935			G	13C-OCDD	73.5	17 - 157	
2,3,7,8-TCDF	ND	0.0517			13C-2,3,7,8-TCDF	72.7	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0652			13C-1,2,3,7,8-PeCDF	69.4	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0670			13C-2,3,4,7,8-PeCDF	73.5	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0666			13C-1,2,3,4,7,8-HxCDF	58.0	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0649			13C-1,2,3,6,7,8-HxCDF	55.5	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0711			13C-2,3,4,6,7,8-HxCDF	64.1	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0949			13C-1,2,3,7,8,9-HxCDF	61.9	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.220			13C-1,2,3,4,6,7,8-HpCDF	68.3	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0888			13C-1,2,3,4,7,8,9-HpCDF	74.6	26 - 138	
OCDF	ND	0.120			13C-OCDF	70.0	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	70.2	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 0.000281

TOTALS

Total TCDD	ND	0.0762		
Total PeCDD	ND	0.0893		
Total HxCDD	ND	0.234		
Total HpCDD	0.173		0.379	
Total TCDF	ND	0.0517		
Total PeCDF	ND	0.0947		
Total HxCDF	ND	0.108		
Total HpCDF	ND	0.237		

EMF
2/26/14

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR103LDEB (Secondary)

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 08-Aug-2013 18:13

Sample Data

Matrix: Aqueous
 Sample Size: 9.75 L

Laboratory Data

Lab Sample: 1300565-03 Date Received: 13-Aug-2013 9:45
 QC Batch: B3H0058 Date Extracted: 22-Aug-2013 9:57
 Date Analyzed: 23-Aug-13 20:35 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0602			IS 13C-2,3,7,8-TCDD	80.4	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0533			13C-1,2,3,7,8-PeCDD	89.4	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.172			13C-1,2,3,4,7,8-HxCDD	85.2	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.346			13C-1,2,3,6,7,8-HxCDD	89.3	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.189			13C-1,2,3,7,8,9-HxCDD	87.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	0.980			G	13C-1,2,3,4,6,7,8-HpCDD	93.9	23 - 140	
OCDD	13.3				13C-OCDD	85.8	17 - 157	
2,3,7,8-TCDF	ND	0.0666			13C-2,3,7,8-TCDF	94.6	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0945			13C-1,2,3,7,8-PeCDF	86.8	24 - 185	
2,3,4,7,8-PeCDF	ND	0.188			13C-2,3,4,7,8-PeCDF	91.3	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0573			13C-1,2,3,4,7,8-HxCDF	79.2	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0592			13C-1,2,3,6,7,8-HxCDF	75.8	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0671			13C-2,3,4,6,7,8-HxCDF	82.5	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0800			13C-1,2,3,7,8,9-HxCDF	86.5	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.183			13C-1,2,3,4,6,7,8-HpCDF	85.3	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0488			13C-1,2,3,4,7,8,9-HpCDF	88.8	26 - 138	
OCDF	ND	0.158			13C-OCDF	81.4	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	88.2	35 - 197	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin 0.0138

TOTALS

Total TCDD	ND	0.0602		
Total PeCDD	ND	0.108		
Total HxCDD	ND		0.0650	
Total HpCDD	1.97			
Total TCDF	ND	0.154		
Total PeCDF	ND	0.202		
Total HxCDF	0.116		0.187	
Total HpCDF	ND		0.140	

LCL-UCL- Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

Sample ID: PR103LPEB (Primary)

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Filter	Lab Sample:	1300565-02	Date Received:	13-Aug-2013 9:45
Project:	Lower Passiac River Study CSO/SWO				QC Batch:	B3H0059	Date Extracted:	22-Aug-2013 10:16
Date Collected:	08-Aug-2013 18:13				Date Analyzed :	24-Aug-13 12:00	Column:	ZB-5MS Analyst: ANP
Analyte	Conc. (pg/Sample)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.287			IS 13C-2,3,7,8-TCDD	84.1	25 - 164	
1,2,3,7,8-PeCDD	ND	0.420			13C-1,2,3,7,8-PeCDD	75.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.483			13C-1,2,3,4,7,8-HxCDD	89.4	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.477			13C-1,2,3,6,7,8-HxCDD	95.1	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.582			13C-1,2,3,7,8,9-HxCDD	90.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.895			13C-1,2,3,4,6,7,8-HpCDD	79.0	23 - 140	
OCDD	ND		3.38		13C-OCDD	79.2	17 - 157	
2,3,7,8-TCDF	ND	0.282			13C-2,3,7,8-TCDF	79.9	24 - 169	
1,2,3,7,8-PeCDF	ND	0.230			13C-1,2,3,7,8-PeCDF	77.1	24 - 185	
2,3,4,7,8-PeCDF	ND	0.230			13C-2,3,4,7,8-PeCDF	72.9	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.153			13C-1,2,3,4,7,8-HxCDF	89.3	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.145			13C-1,2,3,6,7,8-HxCDF	98.2	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.173			13C-2,3,4,6,7,8-HxCDF	93.1	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.252			13C-1,2,3,7,8,9-HxCDF	86.6	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.246			13C-1,2,3,4,6,7,8-HpCDF	83.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.422			13C-1,2,3,4,7,8,9-HpCDF	80.1	26 - 138	
OCDF	ND	0.479			13C-OCDF	77.6	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	84.9	35 - 197	
TOTALS					Toxic Equivalent Quotient (TEQ) Data			
Total TCDD	ND	0.287			TEQMinWHO2005Dioxin	0.00		
Total PeCDD	ND	0.420						
Total HxCDD	ND	0.582						
Total HpCDD	ND	0.895						
Total TCDF	ND	0.282						
Total PeCDF	ND	0.230						
Total HxCDF	ND	0.252						
Total HpCDF	ND	0.422						

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR103LPEB (Secondary)

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Filter	Lab Sample:	1300565-04	Date Received:	13-Aug-2013 9:45
Project:	Lower Passiac River Study CSO/SWO				QC Batch:	B3H0064	Date Extracted:	22-Aug-2013 15:48
Date Collected:	08-Aug-2013 18:13				Date Analyzed:	24-Aug-13 12:52	Column:	ZB-5MS Analyst: ANP
Analyte	Conc. (pg/Sample)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.285			IS 13C-2,3,7,8-TCDD	80.4	25 - 164	
1,2,3,7,8-PeCDD	ND	0.332			13C-1,2,3,7,8-PeCDD	87.0	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.477			13C-1,2,3,4,7,8-HxCDD	91.0	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.492			13C-1,2,3,6,7,8-HxCDD	92.3	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.563			13C-1,2,3,7,8,9-HxCDD	93.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	1.64			G	13C-1,2,3,4,6,7,8-HpCDD	77.3	23 - 140	
OCDD	11.8				13C-OCDD	70.0	17 - 157	
2,3,7,8-TCDF	ND	0.308			13C-2,3,7,8-TCDF	70.2	24 - 169	
1,2,3,7,8-PeCDF	ND	0.206			13C-1,2,3,7,8-PeCDF	83.7	24 - 185	
2,3,4,7,8-PeCDF	ND	0.192			13C-2,3,4,7,8-PeCDF	86.4	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.238			13C-1,2,3,4,7,8-HxCDF	91.9	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.223			13C-1,2,3,6,7,8-HxCDF	102	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.263			13C-2,3,4,6,7,8-HxCDF	95.6	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.417			13C-1,2,3,7,8,9-HxCDF	87.0	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.343			13C-1,2,3,4,6,7,8-HpCDF	78.5	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.596			13C-1,2,3,4,7,8,9-HpCDF	69.4	26 - 138	
OCDF	ND		1.62		13C-OCDF	69.3	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	79.4	35 - 197	
TOTALS					Toxic Equivalent Quotient (TEQ) Data			
Total TCDD	ND	0.285			TEQMinWHO2005Dioxin	0.0199		
Total PeCDD	ND	0.332						
Total HxCDD	ND	0.563						
Total HpCDD	3.88							
Total TCDF	ND	0.308						
Total PeCDF	ND	0.206						
Total HxCDF	ND	0.417						
Total HpCDF	ND	0.596						

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: PR108CFRB

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 03-Oct-2013 8:30

Sample Data

Matrix: Aqueous
 Sample Size: 1.00 L

Laboratory Data

Lab Sample: 1300678-01 Date Received: 04-Oct-2013 9:21
 QC Batch: B3J0088 Date Extracted: 22-Oct-2013 8:10
 Date Analyzed: 27-Oct-13 04:07 Column: ZB-5MS Analyst: FEB

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		0.127		IS 13C-2,3,7,8-TCDD	78.3	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0504			13C-1,2,3,7,8-PeCDD	56.7	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.0550			13C-1,2,3,4,7,8-HxCDD	64.5	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.0654			13C-1,2,3,6,7,8-HxCDD	64.3	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.0695			13C-1,2,3,7,8,9-HxCDD	61.1	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.117			13C-1,2,3,4,6,7,8-HpCDD	55.0	23 - 140	
OCDD	ND		0.453		13C-OCDD	46.6	17 - 157	
2,3,7,8-TCDF	ND	0.0343			13C-2,3,7,8-TCDF	80.8	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0341			13C-1,2,3,7,8-PeCDF	63.5	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0330			13C-2,3,4,7,8-PeCDF	63.2	21 - 178	
1,2,3,4,7,8-HxCDF	0.127			G	13C-1,2,3,4,7,8-HxCDF	65.1	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0311			13C-1,2,3,6,7,8-HxCDF	65.4	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0375			13C-2,3,4,6,7,8-HxCDF	63.8	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0535			13C-1,2,3,7,8,9-HxCDF	59.2	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND		0.184		13C-1,2,3,4,6,7,8-HpCDF	57.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0816			13C-1,2,3,4,7,8,9-HpCDF	54.6	26 - 138	
OCDF	0.596			G	13C-OCDF	44.8	17 - 157	
TOTALS					CRS 37Cl-2,3,7,8-TCDD	87.4	35 - 197	
Total TCDD	0.0700		0.197		EMF 2/26/16			
Total PeCDD	ND	0.0504						
Total HxCDD	ND	0.0695						
Total HpCDD	ND	0.117						
Total TCDF	ND	0.0343						
Total PeCDF	ND	0.0341						
Total HxCDF	0.127							
Total HpCDF	ND		0.184					

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: PR1CSOCLYWW-02B

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 07-Dec-2013 2:15

Sample Data

Matrix: Aqueous
 Sample Size: 9.73 L

Laboratory Data

Lab Sample: 1300844-01 Date Received: 11-Dec-2013 10:31
 QC Batch: B4A0025 Date Extracted: 07-Jan-2014 8:15
 Date Analyzed: 13-Jan-14 08:36 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.246			IS 13C-2,3,7,8-TCDD	67.8	25 - 164	
1,2,3,7,8-PeCDD	ND	0.728			13C-1,2,3,7,8-PeCDD	68.0	25 - 181	
1,2,3,4,7,8-HxCDD	0.801			G	13C-1,2,3,4,7,8-HxCDD	51.5	32 - 141	
1,2,3,6,7,8-HxCDD	2.56			G	13C-1,2,3,6,7,8-HxCDD	52.9	28 - 130	
1,2,3,7,8,9-HxCDD	1.74			G	13C-1,2,3,7,8,9-HxCDD	48.7	32 - 141	
1,2,3,4,6,7,8-HpCDD	84.3				13C-1,2,3,4,6,7,8-HpCDD	49.5	23 - 140	
OCDD	1090				13C-OCDD	52.8	17 - 157	
2,3,7,8-TCDF	ND	0.396			13C-2,3,7,8-TCDF	76.7	24 - 169	
1,2,3,7,8-PeCDF	ND	0.436			13C-1,2,3,7,8-PeCDF	90.8	24 - 185	
2,3,4,7,8-PeCDF	0.537			G	13C-2,3,4,7,8-PeCDF	91.6	21 - 178	
1,2,3,4,7,8-HxCDF	1.68			G	13C-1,2,3,4,7,8-HxCDF	65.5	26 - 152	
1,2,3,6,7,8-HxCDF	1.83			G	13C-1,2,3,6,7,8-HxCDF	56.8	26 - 123	
2,3,4,6,7,8-HxCDF	1.72			G	13C-2,3,4,6,7,8-HxCDF	55.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.504			13C-1,2,3,7,8,9-HxCDF	52.1	29 - 147	
1,2,3,4,6,7,8-HpCDF	25.1				13C-1,2,3,4,6,7,8-HpCDF	48.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		1.82		13C-1,2,3,4,7,8,9-HpCDF	55.8	26 - 138	
OCDF	60.4				13C-OCDF	51.0	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	113	35 - 197	
TOTALS								
Total TCDD	ND	0.308						
Total PeCDD	4.12		4.60					
Total HxCDD	19.7							
Total HpCDD	200							
Total TCDF	0.370							
Total PeCDF	4.95		7.00					
Total HxCDF	28.4							
Total HpCDF	52.4		54.2					

DL = Sample specific estimated detection limit

EMPC = Estimated maximum possible concentration

LCL-UCL = Lower control limit - upper control limit

TS
 2/26/14

Sample ID: PRIWWDUP-02B

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passaic River Study CSO/SWO
 Date Collected: 07-Dec-2013 2:15

Sample Data

Matrix: Aqueous
 Sample Size: 9.63 L

Laboratory Data

Lab Sample: 1300844-02 Date Received: 11-Dec-2013 10:31
 QC Batch: B4A0025 Date Extracted: 07-Jan-2014 8:15
 Date Analyzed: 13-Jan-14 09:26 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.166			IS 13C-2,3,7,8-TCDD	63.6	25 - 164	
1,2,3,7,8-PeCDD	ND		0.421		13C-1,2,3,7,8-PeCDD	60.2	25 - 181	
1,2,3,4,7,8-HxCDD	0.893			G	13C-1,2,3,4,7,8-HxCDD	47.6	32 - 141	
1,2,3,6,7,8-HxCDD	2.76				13C-1,2,3,6,7,8-HxCDD	49.5	28 - 130	
1,2,3,7,8,9-HxCDD	1.94			G	13C-1,2,3,7,8,9-HxCDD	45.4	32 - 141	
1,2,3,4,6,7,8-HpCDD	87.4				13C-1,2,3,4,6,7,8-HpCDD	46.1	23 - 140	
OCDD	1230				13C-OCDD	44.7	17 - 157	
2,3,7,8-TCDF	0.159			G	13C-2,3,7,8-TCDF	65.2	24 - 169	
1,2,3,7,8-PeCDF	ND	0.495			13C-1,2,3,7,8-PeCDF	64.5	24 - 185	
2,3,4,7,8-PeCDF	ND	0.490			13C-2,3,4,7,8-PeCDF	66.6	21 - 178	
1,2,3,4,7,8-HxCDF	2.05			G	13C-1,2,3,4,7,8-HxCDF	54.9	26 - 152	
1,2,3,6,7,8-HxCDF	2.11			G	13C-1,2,3,6,7,8-HxCDF	51.6	26 - 123	
2,3,4,6,7,8-HxCDF	1.94			G	13C-2,3,4,6,7,8-HxCDF	50.2	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.292			13C-1,2,3,7,8,9-HxCDF	48.9	29 - 147	
1,2,3,4,6,7,8-HpCDF	29.2				13C-1,2,3,4,6,7,8-HpCDF	46.4	28 - 143	
1,2,3,4,7,8,9-HpCDF	2.61				13C-1,2,3,4,7,8,9-HpCDF	50.5	26 - 138	
OCDF	71.0				13C-OCDF	45.0	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	105	35 - 197	
TOTALS								
Total TCDD	ND	0.224						
Total PeCDD	4.50		4.92					
Total HxCDD	20.9							
Total HpCDD	193							
Total TCDF	0.869							
Total PeCDF	7.03							
Total HxCDF	34.0							
Total HpCDF	64.1							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

TJS
 2/26/14

Sample ID: PR1CSOCLYHP-02B

EPA Method 1613B

Client Data			Sample Data		Laboratory Data				
Name:	Tierra Solutions, Inc.		Matrix:	Solid	Lab Sample:	1300845-01	Date Received:	12-Dec-2013 10:31	
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	13.8 g	QC Batch:	B4A0010	Date Extracted:	02-Jan-2014 10:02	
Date Collected:	07-Dec-2013 2:15		% Solids:	36.3	Date Analyzed :	07-Jan-14 19:13	Column: ZB-5MS	Analyst: MAS	
					16-Jan-14 22:57 Column: SP-2331 Analyst: ANP				
Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	1.24				IS	13C-2,3,7,8-TCDD	87.4	25 - 164	
1,2,3,7,8-PeCDD	ND		3.74			13C-1,2,3,7,8-PeCDD	92.2	25 - 181	
1,2,3,4,7,8-HxCDD	6.32					13C-1,2,3,4,7,8-HxCDD	93.4	32 - 141	
1,2,3,6,7,8-HxCDD	21.1					13C-1,2,3,6,7,8-HxCDD	94.5	28 - 130	
1,2,3,7,8,9-HxCDD	15.2					13C-1,2,3,7,8,9-HxCDD	92.8	32 - 141	
1,2,3,4,6,7,8-HpCDD	700					13C-1,2,3,4,6,7,8-HpCDD	104	23 - 140	
OCDD	9590			E		13C-OCDD	112	17 - 157	
2,3,7,8-TCDF	3.47					13C-2,3,7,8-TCDF	90.5	24 - 169	
1,2,3,7,8-PeCDF	2.78			G		13C-1,2,3,7,8-PeCDF	95.4	24 - 185	
2,3,4,7,8-PeCDF	4.04			G		13C-2,3,4,7,8-PeCDF	96.3	21 - 178	
1,2,3,4,7,8-HxCDF	12.0					13C-1,2,3,4,7,8-HxCDF	88.1	26 - 152	
1,2,3,6,7,8-HxCDF	11.6					13C-1,2,3,6,7,8-HxCDF	88.0	26 - 123	
2,3,4,6,7,8-HxCDF	10.5					13C-2,3,4,6,7,8-HxCDF	87.2	28 - 136	
1,2,3,7,8,9-HxCDF	ND	2.60				13C-1,2,3,7,8,9-HxCDF	93.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	205					13C-1,2,3,4,6,7,8-HpCDF	90.3	28 - 143	
1,2,3,4,7,8,9-HpCDF	13.3					13C-1,2,3,4,7,8,9-HpCDF	100	26 - 138	
OCDF	444					13C-OCDF	98.8	17 - 157	
					CRS	37Cl-2,3,7,8-TCDD	102	35 - 197	
TOTALS									
Total TCDD	14.0	12.8			Enf				
Total PeCDD	42.0		45.8		2/26/16				
Total HxCDD	186								
Total HpCDD	1620								
Total TCDF	66.1		67.4						
Total PeCDF	136								
Total HxCDF	242								
Total HpCDF	440								

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PR1HPDUP-02B

EPA Method 1613B

Client Data		Sample Data		Laboratory Data				
Name:	Tierra Solutions, Inc.	Matrix:	Solid	Lab Sample:	1300845-02	Date Received:	12-Dec-2013 10:31	
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	15.4 g	QC Batch:	B4A0010	Date Extracted:	02-Jan-2014 10:02	
Date Collected:	07-Dec-2013 2:15	% Solids:	36.4	Date Analyzed :	07-Jan-14 20:04	Column: ZB-5MS	Analyst: MAS	
					16-Jan-14 23:46	Column: SP-2331	Analyst: ANP	
Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	1.60				IS 13C-2,3,7,8-TCDD	85.7	25 - 164	
1,2,3,7,8-PeCDD	3.98			G	13C-1,2,3,7,8-PeCDD	91.9	25 - 181	
1,2,3,4,7,8-HxCDD	6.16				13C-1,2,3,4,7,8-HxCDD	89.5	32 - 141	
1,2,3,6,7,8-HxCDD	19.8				13C-1,2,3,6,7,8-HxCDD	92.1	28 - 130	
1,2,3,7,8,9-HxCDD	14.2				13C-1,2,3,7,8,9-HxCDD	90.3	32 - 141	
1,2,3,4,6,7,8-HpCDD	636				13C-1,2,3,4,6,7,8-HpCDD	101	23 - 140	
OCDD	9560			E	13C-OCDD	109	17 - 157	
2,3,7,8-TCDF	2.88				13C-2,3,7,8-TCDF	86.9	24 - 169	
1,2,3,7,8-PeCDF	2.66			G	13C-1,2,3,7,8-PeCDF	91.8	24 - 185	
2,3,4,7,8-PeCDF	2.82			G	13C-2,3,4,7,8-PeCDF	93.3	21 - 178	
1,2,3,4,7,8-HxCDF	11.7				13C-1,2,3,4,7,8-HxCDF	83.9	26 - 152	
1,2,3,6,7,8-HxCDF	11.1				13C-1,2,3,6,7,8-HxCDF	84.0	26 - 123	
2,3,4,6,7,8-HxCDF	7.89				13C-2,3,4,6,7,8-HxCDF	85.6	28 - 136	
1,2,3,7,8,9-HxCDF	ND	2.76			13C-1,2,3,7,8,9-HxCDF	87.9	29 - 147	
1,2,3,4,6,7,8-HpCDF	197				13C-1,2,3,4,6,7,8-HpCDF	88.4	28 - 143	
1,2,3,4,7,8,9-HpCDF	12.5				13C-1,2,3,4,7,8,9-HpCDF	95.2	26 - 138	
OCDF	458				13C-OCDF	99.7	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	98.9	35 - 197	
TOTALS								
Total TCDD	10.3		43.8 12.1					
Total PeCDD	42.4		43.1					
Total HxCDD	166							
Total HpCDD	1460							
Total TCDF	64.3							
Total PeCDF	121		126					
Total HxCDF	231							
Total HpCDF	429							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PR109CFRB

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	1300693-01	Date Received:	12-Oct-2013 9:54
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	9.59 L	QC Batch:	B3K0002	Date Extracted:	01-Nov-2013 8:14
Date Collected:	11-Oct-2013 12:00				Date Analyzed:	04-Nov-13 18:22	Column:	ZB-5MS Analyst: FEB
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	1.42				IS 13C-2,3,7,8-TCDD	84.0	25 - 164	
1,2,3,7,8-PeCDD	ND	0.109			13C-1,2,3,7,8-PeCDD	69.5	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.0926			13C-1,2,3,4,7,8-HxCDD	61.8	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.100			13C-1,2,3,6,7,8-HxCDD	68.2	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.125			13C-1,2,3,7,8,9-HxCDD	61.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.189			13C-1,2,3,4,6,7,8-HpCDD	51.5	23 - 140	
OCDD	2.70			G	13C-OCDD	43.6	17 - 157	
2,3,7,8-TCDF	0.176			G	13C-2,3,7,8-TCDF	86.0	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0840			13C-1,2,3,7,8-PeCDF	69.4	24 - 185	
2,3,4,7,8-PeCDF	ND		0.286		13C-2,3,4,7,8-PeCDF	73.8	21 - 178	
1,2,3,4,7,8-HxCDF	2.51			G	13C-1,2,3,4,7,8-HxCDF	61.8	26 - 152	
1,2,3,6,7,8-HxCDF	0.422			G	13C-1,2,3,6,7,8-HxCDF	62.7	26 - 123	
2,3,4,6,7,8-HxCDF	0.215			G	13C-2,3,4,6,7,8-HxCDF	63.9	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.115			13C-1,2,3,7,8,9-HxCDF	58.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	8.23				13C-1,2,3,4,6,7,8-HpCDF	55.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.220			13C-1,2,3,4,7,8,9-HpCDF	53.1	26 - 138	
OCDF	22.0				13C-OCDF	46.3	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	90.6	35 - 197	
TOTALS								
Total TCDD	1.42		1.62		EUF 2/26/16			
Total PeCDD	ND	0.109						
Total HxCDD	ND	0.125						
Total HpCDD	0.345							
Total TCDF	0.802							
Total PeCDF	1.23		1.89					
Total HxCDF	4.92		5.06					
Total HpCDF	9.06							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PR101HLLC

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 11-Oct-2013 14:30

Sample Data

Matrix: Aqueous
 Sample Size: 9.17 L

Laboratory Data

Lab Sample: 1300693-02 Date Received: 12-Oct-2013 9:54
 QC Batch: B3K0002 Date Extracted: 01-Nov-2013 8:14
 Date Analyzed: 04-Nov-13 19:13 Column: ZB-5MS Analyst: FEB

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.0605			IS 13C-2,3,7,8-TCDD	82.3	25 - 164	
1,2,3,7,8-PeCDD	ND	0.0680			13C-1,2,3,7,8-PeCDD	75.6	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.0665			13C-1,2,3,4,7,8-HxCDD	73.6	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.0731			13C-1,2,3,6,7,8-HxCDD	80.4	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.0819			13C-1,2,3,7,8,9-HxCDD	75.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.170			13C-1,2,3,4,6,7,8-HpCDD	63.2	23 - 140	
OCDD	ND	0.152			13C-OCDD	56.8	17 - 157	
2,3,7,8-TCDF	ND	0.0438			13C-2,3,7,8-TCDF	80.8	24 - 169	
1,2,3,7,8-PeCDF	ND	0.0308			13C-1,2,3,7,8-PeCDF	77.2	24 - 185	
2,3,4,7,8-PeCDF	ND	0.0283			13C-2,3,4,7,8-PeCDF	80.2	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0278			13C-1,2,3,4,7,8-HxCDF	73.7	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0272			13C-1,2,3,6,7,8-HxCDF	75.0	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0305			13C-2,3,4,6,7,8-HxCDF	78.3	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0417			13C-1,2,3,7,8,9-HxCDF	71.8	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.0457			13C-1,2,3,4,6,7,8-HpCDF	68.6	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0698			13C-1,2,3,4,7,8,9-HpCDF	66.7	26 - 138	
OCDF	ND	0.119			13C-OCDF	57.7	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	84.1	35 - 197	
TOTALS								
Total TCDD	ND	0.0605						
Total PeCDD	ND	0.0680						
Total HxCDD	ND	0.0819						
Total HpCDD	ND	0.170						
Total TCDF	ND	0.0438						
Total PeCDF	ND	0.0308						
Total HxCDF	ND	0.0417						
Total HpCDF	ND	0.0698						

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

EMF
2/26/16

Sample ID: PR1CSOCLYHD-02B

EPA Method 1613B

Client Data


Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 07-Dec-2013 2:15

Sample Data

Matrix: Aqueous
 Sample Size: 9.66 L

Laboratory Data

Lab Sample: 1300838-01 Date Received: 11-Dec-2013 10:31
 QC Batch: B3L0139 Date Extracted: 31-Dec-2013 8:51
 Date Analyzed: 02-Jan-14 23:42 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.187			IS 13C-2,3,7,8-TCDD	61.6	25 - 164	
1,2,3,7,8-PeCDD	ND		0.250		13C-1,2,3,7,8-PeCDD	67.8	25 - 181	
1,2,3,4,7,8-HxCDD	0.606			G	13C-1,2,3,4,7,8-HxCDD	42.0	32 - 141	
1,2,3,6,7,8-HxCDD	1.79			G	13C-1,2,3,6,7,8-HxCDD	41.3	28 - 130	
1,2,3,7,8,9-HxCDD	1.22			G	13C-1,2,3,7,8,9-HxCDD	41.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	38.5				13C-1,2,3,4,6,7,8-HpCDD	47.8	23 - 140	
OCDD	338				13C-OCDD	41.4	17 - 157	
2,3,7,8-TCDF	ND	0.154			13C-2,3,7,8-TCDF	59.9	24 - 169	
1,2,3,7,8-PeCDF	ND	0.224			13C-1,2,3,7,8-PeCDF	63.1	24 - 185	
2,3,4,7,8-PeCDF	0.288			G	13C-2,3,4,7,8-PeCDF	64.9	21 - 178	
1,2,3,4,7,8-HxCDF	1.23			G	13C-1,2,3,4,7,8-HxCDF	53.2	26 - 152	
1,2,3,6,7,8-HxCDF	1.45			G	13C-1,2,3,6,7,8-HxCDF	52.0	26 - 123	
2,3,4,6,7,8-HxCDF	1.10			G	13C-2,3,4,6,7,8-HxCDF	51.8	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.188			13C-1,2,3,7,8,9-HxCDF	49.6	29 - 147	
1,2,3,4,6,7,8-HpCDF	17.3				13C-1,2,3,4,6,7,8-HpCDF	50.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	1.58			G	13C-1,2,3,4,7,8,9-HpCDF	50.9	26 - 138	
OCDF	42.3				13C-OCDF	44.0	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	114	35 - 197	
TOTALS								
Total TCDD	0.275							
Total PeCDD	1.02		1.50					
Total HxCDD	12.1							
Total HpCDD	74.3							
Total TCDF	ND	0.379						
Total PeCDF	3.97							
Total HxCDF	21.4							
Total HpCDF	39.0							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PR1HDDUP-02B

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	1300838-02	Date Received:	11-Dec-2013 10:31
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	9.84 L	QC Batch:	B3L0139	Date Extracted:	31-Dec-2013 8:51
Date Collected:	07-Dec-2013 2:15				Date Analyzed:	02-Jan-14 22:54	Column:	ZB-5MS Analyst: MAS
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.176			IS 13C-2,3,7,8-TCDD	62.1	25 - 164	
1,2,3,7,8-PeCDD	ND	0.504			13C-1,2,3,7,8-PeCDD	59.8	25 - 181	
1,2,3,4,7,8-HxCDD	0.505			G	13C-1,2,3,4,7,8-HxCDD	43.7	32 - 141	
1,2,3,6,7,8-HxCDD	ND		1.44		13C-1,2,3,6,7,8-HxCDD	35.6	28 - 130	
1,2,3,7,8,9-HxCDD	1.35			G	13C-1,2,3,7,8,9-HxCDD	39.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	30.5				13C-1,2,3,4,6,7,8-HpCDD	47.4	23 - 140	
OCDD	199				13C-OCDD	45.7	17 - 157	
2,3,7,8-TCDF	ND	0.146			13C-2,3,7,8-TCDF	62.2	24 - 169	
1,2,3,7,8-PeCDF	ND	0.296			13C-1,2,3,7,8-PeCDF	58.7	24 - 185	
2,3,4,7,8-PeCDF	ND	0.306			13C-2,3,4,7,8-PeCDF	62.2	21 - 178	
1,2,3,4,7,8-HxCDF	0.959			G	13C-1,2,3,4,7,8-HxCDF	51.3	26 - 152	
1,2,3,6,7,8-HxCDF	1.08			G	13C-1,2,3,6,7,8-HxCDF	52.2	26 - 123	
2,3,4,6,7,8-HxCDF	0.962			G	13C-2,3,4,6,7,8-HxCDF	50.6	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.268			13C-1,2,3,7,8,9-HxCDF	49.5	29 - 147	
1,2,3,4,6,7,8-HpCDF	13.4				13C-1,2,3,4,6,7,8-HpCDF	48.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	1.20			G	13C-1,2,3,4,7,8,9-HpCDF	51.5	26 - 138	
OCDF	32.5				13C-OCDF	45.2	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	82.1	35 - 197	
TOTALS								
Total TCDD	ND		0.136		EMF 2/26/14			
Total PeCDD	0.707		0.890					
Total HxCDD	7.05		10.8					
Total HpCDD	58.3							
Total TCDF	0.228							
Total PeCDF	3.16							
Total HxCDF	14.5		16.9					
Total HpCDF	31.5							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PR1LPDUP-02B
EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Filter	Lab Sample:	1300858-02	Date Received: 13-Dec-2013 10:00
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	0.128 g	QC Batch:	B4A0023	Date Extracted: 06-Jan-2014 13:52
Date Collected:	12-Dec-2013 14:20			Date Analyzed :	13-Jan-14 07:48	Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	9.53			IS 13C-2,3,7,8-TCDD	86.5	25 - 164	
1,2,3,7,8-PeCDD	18.1			G	13C-1,2,3,7,8-PeCDD	95.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	52.5			13C-1,2,3,4,7,8-HxCDD	74.3	32 - 141	
1,2,3,6,7,8-HxCDD	106			G	13C-1,2,3,6,7,8-HxCDD	76.8	28 - 130	
1,2,3,7,8,9-HxCDD	81.8			G	13C-1,2,3,7,8,9-HxCDD	74.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	3160				13C-1,2,3,4,6,7,8-HpCDD	76.5	23 - 140	
OCDD	43100				13C-OCDD	89.9	17 - 157	
2,3,7,8-TCDF	ND	17.4			13C-2,3,7,8-TCDF	68.1	24 - 169	
1,2,3,7,8-PeCDF	11.1			G	13C-1,2,3,7,8-PeCDF	90.5	24 - 185	
2,3,4,7,8-PeCDF	11.8			G	13C-2,3,4,7,8-PeCDF	93.0	21 - 178	
1,2,3,4,7,8-HxCDF	53.8			G	13C-1,2,3,4,7,8-HxCDF	90.4	26 - 152	
1,2,3,6,7,8-HxCDF	61.9			G	13C-1,2,3,6,7,8-HxCDF	85.1	26 - 123	
2,3,4,6,7,8-HxCDF	74.6			G	13C-2,3,4,6,7,8-HxCDF	77.2	28 - 136	
1,2,3,7,8,9-HxCDF	ND	23.1			13C-1,2,3,7,8,9-HxCDF	79.2	29 - 147	
1,2,3,4,6,7,8-HpCDF	1110				13C-1,2,3,4,6,7,8-HpCDF	76.2	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		72.8		13C-1,2,3,4,7,8,9-HpCDF	86.0	26 - 138	
OCDF	2600				13C-OCDF	87.6	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	98.4	35 - 197	

TOTALS

Total TCDD	ND	21.7						
Total PeCDD	155							
Total HxCDD	716							
Total HpCDD	7610							
Total TCDF	ND		20.2					
Total PeCDF	275		361					
Total HxCDF	1170							
Total HpCDF	2350		2420					

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PR1CSOCLYLP-02B

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 11-Dec-2013 19:10

Sample Data

Matrix: Filter
 Sample Size: 0.0796 g

Laboratory Data

Lab Sample: 1300858-01 Date Received: 13-Dec-2013 10:00
 QC Batch: B4A0023 Date Extracted: 06-Jan-2014 13:52
 Date Analyzed: 13-Jan-14 06:59 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	18.9			IS 13C-2,3,7,8-TCDD	86.0	25 - 164	
1,2,3,7,8-PeCDD	ND	42.3			13C-1,2,3,7,8-PeCDD	92.0	25 - 181	
1,2,3,4,7,8-HxCDD	ND	72.0			13C-1,2,3,4,7,8-HxCDD	76.1	32 - 141	
1,2,3,6,7,8-HxCDD	156			G	13C-1,2,3,6,7,8-HxCDD	77.5	28 - 130	
1,2,3,7,8,9-HxCDD	114			G	13C-1,2,3,7,8,9-HxCDD	77.4	32 - 141	
1,2,3,4,6,7,8-HpCDD	4920				13C-1,2,3,4,6,7,8-HpCDD	83.5	23 - 140	
OCDD	64000				13C-OCDD	85.9	17 - 157	
2,3,7,8-TCDF	ND	24.2			13C-2,3,7,8-TCDF	68.4	24 - 169	
1,2,3,7,8-PeCDF	ND	29.8			13C-1,2,3,7,8-PeCDF	85.3	24 - 185	
2,3,4,7,8-PeCDF	ND	29.6			13C-2,3,4,7,8-PeCDF	86.2	21 - 178	
1,2,3,4,7,8-HxCDF	ND		70.7		13C-1,2,3,4,7,8-HxCDF	91.4	26 - 152	
1,2,3,6,7,8-HxCDF	88.8			G	13C-1,2,3,6,7,8-HxCDF	87.5	26 - 123	
2,3,4,6,7,8-HxCDF	93.4			G	13C-2,3,4,6,7,8-HxCDF	83.4	28 - 136	
1,2,3,7,8,9-HxCDF	ND	29.3			13C-1,2,3,7,8,9-HxCDF	79.9	29 - 147	
1,2,3,4,6,7,8-HpCDF	1520				13C-1,2,3,4,6,7,8-HpCDF	77.7	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		96.2		13C-1,2,3,4,7,8,9-HpCDF	86.1	26 - 138	
OCDF	3340				13C-OCDF	88.0	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	97.0	35 - 197	
TOTALS								
Total TCDD	ND	32.5			EMF 2/26/16			
Total PeCDD	146		230					
Total HxCDD	983		1050					
Total HpCDD	10100							
Total TCDF	20.9		48.5					
Total PeCDF	378							
Total HxCDF	1540		1610					
Total HpCDF	3140		3230					

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PR1CSOCLYLD-02B

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 11-Dec-2013 19:10

Sample Data

Matrix: Aqueous
 Sample Size: 9.93 L

Laboratory Data

Lab Sample: 1300859-01 Date Received: 13-Dec-2013 10:00
 QC Batch: B4A0069 Date Extracted: 14-Jan-2014 15:19
 Date Analyzed: 16-Jan-14 21:08 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.159			IS 13C-2,3,7,8-TCDD	57.4	25 - 164	
1,2,3,7,8-PeCDD	ND	0.290			13C-1,2,3,7,8-PeCDD	55.4	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.608			13C-1,2,3,4,7,8-HxCDD	36.8	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.691			13C-1,2,3,6,7,8-HxCDD	37.6	28 - 130	
1,2,3,7,8,9-HxCDD	0.530				13C-1,2,3,7,8,9-HxCDD	34.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	11.0				13C-1,2,3,4,6,7,8-HpCDD	34.1	23 - 140	
OCDD	73.2				13C-OCDD	35.1	17 - 157	
2,3,7,8-TCDF	ND	0.174			13C-2,3,7,8-TCDF	58.2	24 - 169	
1,2,3,7,8-PeCDF	ND	0.335			13C-1,2,3,7,8-PeCDF	62.2	24 - 185	
2,3,4,7,8-PeCDF	ND	0.310			13C-2,3,4,7,8-PeCDF	65.6	21 - 178	
1,2,3,4,7,8-HxCDF	ND		0.398		13C-1,2,3,4,7,8-HxCDF	43.9	26 - 152	
1,2,3,6,7,8-HxCDF	0.596				13C-1,2,3,6,7,8-HxCDF	39.9	26 - 123	
2,3,4,6,7,8-HxCDF	0.531				13C-2,3,4,6,7,8-HxCDF	38.3	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.310			13C-1,2,3,7,8,9-HxCDF	34.6	29 - 147	
1,2,3,4,6,7,8-HpCDF	5.33				13C-1,2,3,4,6,7,8-HpCDF	34.1	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		0.543		13C-1,2,3,4,7,8,9-HpCDF	36.8	26 - 138	
OCDF	10.2				13C-OCDF	35.4	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	94.4	35 - 197	
TOTALS								
Total TCDD	ND	0.159			EMF 2/26/14			
Total PeCDD	ND	0.553						
Total HxCDD	3.32							
Total HpCDD	23.0							
Total TCDF	0.129							
Total PeCDF	0.876		1.37					
Total HxCDF	5.68		6.84					
Total HpCDF	11.5		12.1					

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PR1LDDUP-02B

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	1300859-02	Date Received:	13-Dec-2013 10:00
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	9.72 L	QC Batch:	B4A0069	Date Extracted:	14-Jan-2014 15:19
Date Collected:	12-Dec-2013 14:20				Date Analyzed:	16-Jan-14 21:57	Column:	ZB-5MS Analyst: MAS
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.188			IS 13C-2,3,7,8-TCDD	69.8	25 - 164	
1,2,3,7,8-PeCDD	ND	0.205			13C-1,2,3,7,8-PeCDD	68.8	25 - 181	
1,2,3,4,7,8-HxCDD	0.535				13C-1,2,3,4,7,8-HxCDD	43.0	32 - 141	
1,2,3,6,7,8-HxCDD	0.548				13C-1,2,3,6,7,8-HxCDD	44.3	28 - 130	
1,2,3,7,8,9-HxCDD	ND		0.389		13C-1,2,3,7,8,9-HxCDD	41.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	8.92				13C-1,2,3,4,6,7,8-HpCDD	42.5	23 - 140	
OCDD	64.7				13C-OCDD	44.8	17 - 157	
2,3,7,8-TCDF	ND	0.139			13C-2,3,7,8-TCDF	65.4	24 - 169	
1,2,3,7,8-PeCDF	ND	0.264			13C-1,2,3,7,8-PeCDF	73.2	24 - 185	
2,3,4,7,8-PeCDF	ND	0.226			13C-2,3,4,7,8-PeCDF	77.7	21 - 178	
1,2,3,4,7,8-HxCDF	0.549				13C-1,2,3,4,7,8-HxCDF	53.3	26 - 152	
1,2,3,6,7,8-HxCDF	ND		0.496		13C-1,2,3,6,7,8-HxCDF	48.1	26 - 123	
2,3,4,6,7,8-HxCDF	ND		0.322		13C-2,3,4,6,7,8-HxCDF	46.5	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.131			13C-1,2,3,7,8,9-HxCDF	42.8	29 - 147	
1,2,3,4,6,7,8-HpCDF	3.93				13C-1,2,3,4,6,7,8-HpCDF	41.7	28 - 143	
1,2,3,4,7,8,9-HpCDF	0.515				13C-1,2,3,4,7,8,9-HpCDF	47.0	26 - 138	
OCDF	7.75				13C-OCDF	45.0	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	95.0	35 - 197	
TOTALS								
Total TCDD	ND	0.188			EMF 2/26/14			
Total PeCDD	ND	0.306						
Total HxCDD	1.41		3.08					
Total HpCDD	19.8							
Total TCDF	ND	0.309						
Total PeCDF	0.665		1.31					
Total HxCDF	3.95		5.52					
Total HpCDF	9.14							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: PR109CFFB

EPA Method 1613B

Client Data			Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.		Matrix:	Aqueous	Lab Sample:	1400027-03	Date Received:	11-Jan-2014 10:12
Project:	Lower Passiac River Study CSO/SWO		Sample Size:	9.67 L	QC Batch:	B4A0132	Date Extracted:	27-Jan-2014 8:13
Date Collected:	10-Jan-2014 15:35				Date Analyzed:	29-Jan-14 16:22	Column:	ZB-5MS Analyst: MAS
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.146			IS 13C-2,3,7,8-TCDD	54.8	25 - 164	
1,2,3,7,8-PeCDD	ND	0.260			13C-1,2,3,7,8-PeCDD	59.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.455			13C-1,2,3,4,7,8-HxCDD	43.2	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.481			13C-1,2,3,6,7,8-HxCDD	44.1	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.521			13C-1,2,3,7,8,9-HxCDD	41.6	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	1.06			13C-1,2,3,4,6,7,8-HpCDD	40.9	23 - 140	
OCDD	ND	0.699			13C-OCDD	41.9	17 - 157	
2,3,7,8-TCDF	ND	0.137			13C-2,3,7,8-TCDF	75.7	24 - 169	
1,2,3,7,8-PeCDF	ND	0.242			13C-1,2,3,7,8-PeCDF	67.0	24 - 185	
2,3,4,7,8-PeCDF	ND	0.221			13C-2,3,4,7,8-PeCDF	69.5	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.123			13C-1,2,3,4,7,8-HxCDF	49.6	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.133			13C-1,2,3,6,7,8-HxCDF	48.0	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0684			13C-2,3,4,6,7,8-HxCDF	45.8	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0973			13C-1,2,3,7,8,9-HxCDF	44.2	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.232			13C-1,2,3,4,6,7,8-HpCDF	41.9	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.146			13C-1,2,3,4,7,8,9-HpCDF	48.1	26 - 138	
OCDF	ND	0.425			13C-OCDF	43.4	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	82.0	35 - 197	
TOTALS								
Total TCDD	ND	0.146			EMF 2/26/16			
Total PeCDD	ND	0.423						
Total HxCDD	ND	0.678						
Total HpCDD	ND	1.06						
Total TCDF	ND	0.137						
Total PeCDF	ND	0.497						
Total HxCDF	ND	0.157						
Total HpCDF	ND	0.240						

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PR110CFRB
EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Aqueous	Lab Sample:	1400027-01	Date Received: 11-Jan-2014 10:12
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	9.77 L	QC Batch:	B4A0132	Date Extracted: 27-Jan-2014 8:13
Date Collected:	10-Jan-2014 8:45			Date Analyzed:	29-Jan-14 14:45	Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	0.387			G	IS 13C-2,3,7,8-TCDD	78.7	25 - 164	
1,2,3,7,8-PeCDD	ND	0.266			13C-1,2,3,7,8-PeCDD	74.2	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.212			13C-1,2,3,4,7,8-HxCDD	55.9	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.405			13C-1,2,3,6,7,8-HxCDD	56.4	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.435			13C-1,2,3,7,8,9-HxCDD	52.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND		0.374		13C-1,2,3,4,6,7,8-HpCDD	51.2	23 - 140	
OCDD	1.38			G	13C-OCDD	49.6	17 - 157	
2,3,7,8-TCDF	ND	0.111			13C-2,3,7,8-TCDF	93.5	24 - 169	
1,2,3,7,8-PeCDF	ND	0.205			13C-1,2,3,7,8-PeCDF	75.2	24 - 185	
2,3,4,7,8-PeCDF	ND	0.194			13C-2,3,4,7,8-PeCDF	79.6	21 - 178	
1,2,3,4,7,8-HxCDF	ND		0.243		13C-1,2,3,4,7,8-HxCDF	61.8	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.132			13C-1,2,3,6,7,8-HxCDF	60.2	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.161			13C-2,3,4,6,7,8-HxCDF	59.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.240			13C-1,2,3,7,8,9-HxCDF	56.1	29 - 147	
1,2,3,4,6,7,8-HpCDF	1.02			G	13C-1,2,3,4,6,7,8-HpCDF	53.6	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.282			13C-1,2,3,4,7,8,9-HpCDF	57.0	26 - 138	
OCDF	3.73			G	13C-OCDF	51.8	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	91.4	35 - 197	

TOTALS

Total TCDD	0.387				<div style="text-align: center;"> EMF 2/26/16 </div>			
Total PeCDD	ND	0.266						
Total HxCDD	ND		0.371					
Total HpCDD	0.461		0.836					
Total TCDF	ND	0.205						
Total PeCDF	ND	0.313						
Total HxCDF	ND		0.381					
Total HpCDF	1.02							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PRICSOCLYWW-01C

EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Aqueous	Lab Sample:	1400326-01	Date Received: 02-May-2014 9:30
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	9.78 L	QC Batch:	B4E0031	Date Extracted: 11-May-2014 19:25
Date Collected:	30-Apr-2014 18:10			Date Analyzed:	15-May-14 23:54	Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		0.0848		IS 13C-2,3,7,8-TCDD	63.1	25 - 164	
1,2,3,7,8-PeCDD	0.425			G	13C-1,2,3,7,8-PeCDD	48.9	25 - 181	
1,2,3,4,7,8-HxCDD	0.914			G	13C-1,2,3,4,7,8-HxCDD	55.8	32 - 141	
1,2,3,6,7,8-HxCDD	2.58				13C-1,2,3,6,7,8-HxCDD	55.7	28 - 130	
1,2,3,7,8,9-HxCDD	2.01			G	13C-1,2,3,7,8,9-HxCDD	55.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	81.5				13C-1,2,3,4,6,7,8-HpCDD	52.6	23 - 140	
OCDD	1060				13C-OCDD	53.4	17 - 157	
2,3,7,8-TCDF	ND		0.244		13C-2,3,7,8-TCDF	65.0	24 - 169	
1,2,3,7,8-PeCDF	0.304			G	13C-1,2,3,7,8-PeCDF	53.0	24 - 185	
2,3,4,7,8-PeCDF	0.850			G	13C-2,3,4,7,8-PeCDF	53.2	21 - 178	
1,2,3,4,7,8-HxCDF	1.80			G	13C-1,2,3,4,7,8-HxCDF	55.0	26 - 152	
1,2,3,6,7,8-HxCDF	1.81			G	13C-1,2,3,6,7,8-HxCDF	51.5	26 - 123	
2,3,4,6,7,8-HxCDF	1.75			G	13C-2,3,4,6,7,8-HxCDF	55.9	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.131			13C-1,2,3,7,8,9-HxCDF	58.9	29 - 147	
1,2,3,4,6,7,8-HpCDF	29.1				13C-1,2,3,4,6,7,8-HpCDF	58.7	28 - 143	
1,2,3,4,7,8,9-HpCDF	2.05			G	13C-1,2,3,4,7,8,9-HpCDF	58.6	26 - 138	
OCDF	53.7				13C-OCDF	52.3	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	83.8	35 - 197	

TOTALS

Total TCDD	0.393		0.726	
Total PeCDD	4.69			
Total HxCDD	20.2			
Total HpCDD	169			
Total TCDF	2.92		4.60	
Total PeCDF	13.6		13.7	
Total HxCDF	31.0			
Total HpCDF	60.4			

BIF
2/26/16

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: PR1CSOCLYHP-01C

EPA Method 1613B

Client Data		Sample Data		Laboratory Data				
Name:	Tierra Solutions, Inc.	Matrix:	Solid	Lab Sample:	1400328-01	Date Received:	02-May-2014 9:30	
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	19.9 g	QC Batch:	B4E0020	Date Extracted:	07-May-2014 13:42	
Date Collected:	30-Apr-2014 18:10	% Solids:	50.2	Date Analyzed :	09-May-14 16:19	Column: ZB-5MS	Analyst: MAS	
					20-May-14 18:29	Column: SP-2331	Analyst: CVG	
Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	1.60				IS 13C-2,3,7,8-TCDD	71.1	25 - 164	
1,2,3,7,8-PeCDD	4.56				13C-1,2,3,7,8-PeCDD	71.1	25 - 181	
1,2,3,4,7,8-HxCDD	9.01				13C-1,2,3,4,7,8-HxCDD	68.3	32 - 141	
1,2,3,6,7,8-HxCDD	24.4				13C-1,2,3,6,7,8-HxCDD	75.3	28 - 130	
1,2,3,7,8,9-HxCDD	17.5				13C-1,2,3,7,8,9-HxCDD	73.0	32 - 141	
1,2,3,4,6,7,8-HpCDD	746				13C-1,2,3,4,6,7,8-HpCDD	68.3	23 - 140	
OCDD	12000			D	13C-OCDD	67.1	17 - 157	D
2,3,7,8-TCDF	3.85				13C-2,3,7,8-TCDF	64.6	24 - 169	
1,2,3,7,8-PeCDF	3.53				13C-1,2,3,7,8-PeCDF	78.5	24 - 185	
2,3,4,7,8-PeCDF	4.77				13C-2,3,4,7,8-PeCDF	72.5	21 - 178	
1,2,3,4,7,8-HxCDF	14.9				13C-1,2,3,4,7,8-HxCDF	79.6	26 - 152	
1,2,3,6,7,8-HxCDF	13.9				13C-1,2,3,6,7,8-HxCDF	73.3	26 - 123	
2,3,4,6,7,8-HxCDF	9.96				13C-2,3,4,6,7,8-HxCDF	74.3	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.267			13C-1,2,3,7,8,9-HxCDF	77.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	253				13C-1,2,3,4,6,7,8-HpCDF	74.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	13.8				13C-1,2,3,4,7,8,9-HpCDF	81.0	26 - 138	
OCDF	488				13C-OCDF	77.9	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	71.7	35 - 197	
TOTALS								
Total TCDD	18.1		19.4	17.8	EMF 2/26/16			
Total PeCDD	46.1							
Total HxCDD	206							
Total HpCDD	1740							
Total TCDF	85.5		88.2					
Total PeCDF	174							
Total HxCDF	299							
Total HpCDF	526							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PRIHPDUP-01C

EPA Method 1613B

Client Data		Sample Data		Laboratory Data			
Name:	Tierra Solutions, Inc.	Matrix:	Solid	Lab Sample:	1400328-02	Date Received:	02-May-2014 9:30
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	19.2 g	QC Batch:	B4E0020	Date Extracted:	07-May-2014 13:42
Date Collected:	30-Apr-2014 18:10	% Solids:	52.0	Date Analyzed :	09-May-14 15:31	Column:	ZB-5MS Analyst: MAS
					20-May-14 19:18	Column:	SP-2331 Analyst: CVG

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		1.28		IS 13C-2,3,7,8-TCDD	80.5	25 - 164	
1,2,3,7,8-PeCDD	4.69				13C-1,2,3,7,8-PeCDD	83.9	25 - 181	
1,2,3,4,7,8-HxCDD	9.24				13C-1,2,3,4,7,8-HxCDD	77.0	32 - 141	
1,2,3,6,7,8-HxCDD	25.0				13C-1,2,3,6,7,8-HxCDD	78.4	28 - 130	
1,2,3,7,8,9-HxCDD	21.0				13C-1,2,3,7,8,9-HxCDD	78.0	32 - 141	
1,2,3,4,6,7,8-HpCDD	818				13C-1,2,3,4,6,7,8-HpCDD	71.7	23 - 140	
OCDD	11600			D	13C-OCDD	79.8	17 - 157	D
2,3,7,8-TCDF	3.60				13C-2,3,7,8-TCDF	72.2	24 - 169	
1,2,3,7,8-PeCDF	3.22				13C-1,2,3,7,8-PeCDF	97.5	24 - 185	
2,3,4,7,8-PeCDF	4.21				13C-2,3,4,7,8-PeCDF	87.8	21 - 178	
1,2,3,4,7,8-HxCDF	14.4				13C-1,2,3,4,7,8-HxCDF	94.8	26 - 152	
1,2,3,6,7,8-HxCDF	14.2				13C-1,2,3,6,7,8-HxCDF	82.1	26 - 123	
2,3,4,6,7,8-HxCDF	10.5				13C-2,3,4,6,7,8-HxCDF	77.5	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.279			13C-1,2,3,7,8,9-HxCDF	79.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	247				13C-1,2,3,4,6,7,8-HpCDF	80.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	14.4				13C-1,2,3,4,7,8,9-HpCDF	84.6	26 - 138	
OCDF	469				13C-OCDF	83.5	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	83.0	35 - 197	

TOTALS

Total TCDD	14.1		16.0	
Total PeCDD	43.1			
Total HxCDD	207			
Total HpCDD	1920			
Total TCDF	75.6		78.0	
Total PeCDF	152		153	
Total HxCDF	287			
Total HpCDF	516			

EMF
2/26/16

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PRICSOCLYHD-01C

EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Aqueous	Lab Sample:	1400327-01	Date Received: 02-May-2014 9:30
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	9.74 L	QC Batch:	B4E0049	Date Extracted: 15-May-2014 8:44
Date Collected:	30-Apr-2014 18:10			Date Analyzed:	19-May-14 17:11	Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.123			IS 13C-2,3,7,8-TCDD	58.6	25 - 164	
1,2,3,7,8-PeCDD	ND		0.187		13C-1,2,3,7,8-PeCDD	42.7	25 - 181	
1,2,3,4,7,8-HxCDD	0.575			G	13C-1,2,3,4,7,8-HxCDD	45.7	32 - 141	
1,2,3,6,7,8-HxCDD	1.42			G	13C-1,2,3,6,7,8-HxCDD	48.1	28 - 130	
1,2,3,7,8,9-HxCDD	1.04			G	13C-1,2,3,7,8,9-HxCDD	45.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	31.3				13C-1,2,3,4,6,7,8-HpCDD	42.2	23 - 140	
OCDD	226				13C-OCDD	40.8	17 - 157	
2,3,7,8-TCDF	0.0775			G	13C-2,3,7,8-TCDF	62.2	24 - 169	
1,2,3,7,8-PeCDF	0.131			G	13C-1,2,3,7,8-PeCDF	47.6	24 - 185	
2,3,4,7,8-PeCDF	ND		0.238		13C-2,3,4,7,8-PeCDF	46.9	21 - 178	
1,2,3,4,7,8-HxCDF	0.976			G	13C-1,2,3,4,7,8-HxCDF	45.9	26 - 152	
1,2,3,6,7,8-HxCDF	1.07			G	13C-1,2,3,6,7,8-HxCDF	43.9	26 - 123	
2,3,4,6,7,8-HxCDF	0.924			G	13C-2,3,4,6,7,8-HxCDF	45.7	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.244			13C-1,2,3,7,8,9-HxCDF	48.0	29 - 147	
1,2,3,4,6,7,8-HpCDF	15.3				13C-1,2,3,4,6,7,8-HpCDF	46.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		1.22		13C-1,2,3,4,7,8,9-HpCDF	47.1	26 - 138	
OCDF	26.8				13C-OCDF	40.5	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	96.7	35 - 197	

TOTALS

Total TCDD	ND	0.134		
Total PeCDD	0.791		0.978	
Total HxCDD	8.91		9.23	
Total HpCDD	57.7			
Total TCDF	0.387		0.668	
Total PeCDF	3.16		4.71	
Total HxCDF	16.4			
Total HpCDF	30.9		32.2	

EMF
2/26/16

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: PR1HDDUP-01C

EPA Method 1613B

Client Data		Sample Data		Laboratory Data				
Name:	Tierra Solutions, Inc.	Matrix:	Aqueous	Lab Sample:	1400327-02	Date Received:	02-May-2014 9:30	
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	10.0 L	QC Batch:	B4E0049	Date Extracted:	15-May-2014 8:44	
Date Collected:	30-Apr-2014 18:10			Date Analyzed :	19-May-14 16:22	Column:	ZB-5MS Analyst: MAS	
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.168			IS 13C-2,3,7,8-TCDD	65.5	25 - 164	
1,2,3,7,8-PeCDD	ND		0.104		13C-1,2,3,7,8-PeCDD	51.0	25 - 181	
1,2,3,4,7,8-HxCDD	0.448			G	13C-1,2,3,4,7,8-HxCDD	53.1	32 - 141	
1,2,3,6,7,8-HxCDD	1.18			G	13C-1,2,3,6,7,8-HxCDD	56.5	28 - 130	
1,2,3,7,8,9-HxCDD	0.834			G	13C-1,2,3,7,8,9-HxCDD	54.4	32 - 141	
1,2,3,4,6,7,8-HpCDD	29.3				13C-1,2,3,4,6,7,8-HpCDD	49.2	23 - 140	
OCDD	269				13C-OCDD	49.3	17 - 157	
2,3,7,8-TCDF	0.0948			G	13C-2,3,7,8-TCDF	68.4	24 - 169	
1,2,3,7,8-PeCDF	ND	0.235			13C-1,2,3,7,8-PeCDF	55.3	24 - 185	
2,3,4,7,8-PeCDF	ND		0.200		13C-2,3,4,7,8-PeCDF	56.7	21 - 178	
1,2,3,4,7,8-HxCDF	0.893			G	13C-1,2,3,4,7,8-HxCDF	56.2	26 - 152	
1,2,3,6,7,8-HxCDF	0.885			G	13C-1,2,3,6,7,8-HxCDF	51.3	26 - 123	
2,3,4,6,7,8-HxCDF	0.793			G	13C-2,3,4,6,7,8-HxCDF	55.4	28 - 136	
1,2,3,7,8,9-HxCDF	ND		0.101		13C-1,2,3,7,8,9-HxCDF	57.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	13.0				13C-1,2,3,4,6,7,8-HpCDF	55.5	28 - 143	
1,2,3,4,7,8,9-HpCDF	1.01			G	13C-1,2,3,4,7,8,9-HpCDF	56.2	26 - 138	
OCDF	23.1				13C-OCDF	48.3	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	96.9	35 - 197	
TOTALS								
Total TCDD	ND		0.0684					
Total PeCDD	1.03		1.13					
Total HxCDD	8.04							
Total HpCDD	55.5							
Total TCDF	0.306		0.686					
Total PeCDF	2.36		3.91					
Total HxCDF	14.0		14.1					
Total HpCDF	27.4							

EMF
2/26/16

EMF
2/26/16

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PRICSOCLYLP-01C

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 05-May-2014 15:05

Sample Data

Matrix: Filter
 Sample Size: 0.0773 g

Laboratory Data

Lab Sample: 1400337-01 Date Received: 07-May-2014 8:50
 QC Batch: B4E0032 Date Extracted: 12-May-2014 14:00
 Date Analyzed: 15-May-14 22:16 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		8.94		IS 13C-2,3,7,8-TCDD	86.5	25 - 164	
1,2,3,7,8-PeCDD	24.4			G	13C-1,2,3,7,8-PeCDD	73.2	25 - 181	
1,2,3,4,7,8-HxCDD	47.7			G	13C-1,2,3,4,7,8-HxCDD	84.5	32 - 141	
1,2,3,6,7,8-HxCDD	135			G	13C-1,2,3,6,7,8-HxCDD	87.5	28 - 130	
1,2,3,7,8,9-HxCDD	105			G	13C-1,2,3,7,8,9-HxCDD	84.8	32 - 141	
1,2,3,4,6,7,8-HpCDD	3750				13C-1,2,3,4,6,7,8-HpCDD	81.5	23 - 140	
OCDD	45500				13C-OCDD	82.3	17 - 157	
2,3,7,8-TCDF	18.9			G	13C-2,3,7,8-TCDF	86.8	24 - 169	
1,2,3,7,8-PeCDF	12.6			G	13C-1,2,3,7,8-PeCDF	80.5	24 - 185	
2,3,4,7,8-PeCDF	43.6			G	13C-2,3,4,7,8-PeCDF	74.7	21 - 178	
1,2,3,4,7,8-HxCDF	80.8			G	13C-1,2,3,4,7,8-HxCDF	83.1	26 - 152	
1,2,3,6,7,8-HxCDF	92.3			G	13C-1,2,3,6,7,8-HxCDF	77.6	26 - 123	
2,3,4,6,7,8-HxCDF	95.9			G	13C-2,3,4,6,7,8-HxCDF	82.4	28 - 136	
1,2,3,7,8,9-HxCDF	ND	17.2			13C-1,2,3,7,8,9-HxCDF	88.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	1760				13C-1,2,3,4,6,7,8-HpCDF	90.8	28 - 143	
1,2,3,4,7,8,9-HpCDF	105			G	13C-1,2,3,4,7,8,9-HpCDF	90.5	26 - 138	
OCDF	3280				13C-OCDF	80.8	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	86.6	35 - 197	
TOTALS								
Total TCDD	17.5		26.4		EMF 2/26/14			
Total PeCDD	46.9		161					
Total HxCDD	903		946					
Total HpCDD	7410							
Total TCDF	183							
Total PeCDF	695		718					
Total HxCDF	1790							
Total HpCDF	3680							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PRILPDUP-O1C

EPA Method 1613B

Client Data		Sample Data		Laboratory Data				
Name:	Tierra Solutions, Inc.	Matrix:	Filter	Lab Sample:	1400337-02	Date Received:	07-May-2014 8:50	
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	0.0808 g	QC Batch:	B4E0032	Date Extracted:	12-May-2014 14:00	
Date Collected:	05-May-2014 17:40			Date Analyzed :	15-May-14 21:27	Column:	ZB-5MS Analyst: MAS	
Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND		16.0		IS 13C-2,3,7,8-TCDD	85.2	25 - 164	
1,2,3,7,8-PeCDD	59.3			G	13C-1,2,3,7,8-PeCDD	76.2	25 - 181	
1,2,3,4,7,8-HxCDD	91.2			G	13C-1,2,3,4,7,8-HxCDD	87.5	32 - 141	
1,2,3,6,7,8-HxCDD	219			G	13C-1,2,3,6,7,8-HxCDD	91.1	28 - 130	
1,2,3,7,8,9-HxCDD	238			G	13C-1,2,3,7,8,9-HxCDD	88.5	32 - 141	
1,2,3,4,6,7,8-HpCDD	7400				13C-1,2,3,4,6,7,8-HpCDD	85.0	23 - 140	
OCDD	109000				13C-OCDD	85.3	17 - 157	
2,3,7,8-TCDF	ND		20.6		13C-2,3,7,8-TCDF	85.0	24 - 169	
1,2,3,7,8-PeCDF	18.3			G	13C-1,2,3,7,8-PeCDF	80.3	24 - 185	
2,3,4,7,8-PeCDF	56.9			G	13C-2,3,4,7,8-PeCDF	79.0	21 - 178	
1,2,3,4,7,8-HxCDF	93.4			G	13C-1,2,3,4,7,8-HxCDF	87.9	26 - 152	
1,2,3,6,7,8-HxCDF	116			G	13C-1,2,3,6,7,8-HxCDF	81.7	26 - 123	
2,3,4,6,7,8-HxCDF	118			G	13C-2,3,4,6,7,8-HxCDF	86.7	28 - 136	
1,2,3,7,8,9-HxCDF	19.4			G	13C-1,2,3,7,8,9-HxCDF	94.1	29 - 147	
1,2,3,4,6,7,8-HpCDF	2230				13C-1,2,3,4,6,7,8-HpCDF	90.7	28 - 143	
1,2,3,4,7,8,9-HpCDF	123			G	13C-1,2,3,4,7,8,9-HpCDF	96.8	26 - 138	
OCDF	4070				13C-OCDF	83.5	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	87.7	35 - 197	
TOTALS								
Total TCDD	52.9		68.9					
Total PeCDD	229		365					
Total HxCDD	1920							
Total HpCDD	17700							
Total TCDF	236		322					
Total PeCDF	868							
Total HxCDF	2150							
Total HpCDF	4630							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PR105LPEB

EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Filter	Lab Sample:	1400337-03	Date Received: 07-May-2014 8:50
Project:	Lower Passaic River Study CSO/SWO	Sample Size:	1.00 g	QC Batch:	B4E0032	Date Extracted: 12-May-2014 14:00
Date Collected:	05-May-2014 16:30			Date Analyzed:	15-May-14 20:38	Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.786			IS 13C-2,3,7,8-TCDD	79.4	25 - 164	
1,2,3,7,8-PeCDD	ND	0.867			13C-1,2,3,7,8-PeCDD	73.0	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.746			13C-1,2,3,4,7,8-HxCDD	85.0	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.792			13C-1,2,3,6,7,8-HxCDD	92.7	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.800			13C-1,2,3,7,8,9-HxCDD	89.2	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	1.14			13C-1,2,3,4,6,7,8-HpCDD	83.7	23 - 140	
OCDD	ND	3.66			13C-OCDD	84.1	17 - 157	
2,3,7,8-TCDF	ND	0.678			13C-2,3,7,8-TCDF	75.8	24 - 169	
1,2,3,7,8-PeCDF	ND	0.739			13C-1,2,3,7,8-PeCDF	75.3	24 - 185	
2,3,4,7,8-PeCDF	ND	0.503			13C-2,3,4,7,8-PeCDF	74.4	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.781			13C-1,2,3,4,7,8-HxCDF	85.2	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.219			13C-1,2,3,6,7,8-HxCDF	82.5	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.227			13C-2,3,4,6,7,8-HxCDF	85.3	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.321			13C-1,2,3,7,8,9-HxCDF	91.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.524			13C-1,2,3,4,6,7,8-HpCDF	89.9	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.272			13C-1,2,3,4,7,8,9-HpCDF	93.7	26 - 138	
OCDF	ND	1.05			13C-OCDF	81.5	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	84.8	35 - 197	
TOTALS								
Total TCDD	ND	0.786						
Total PeCDD	ND	1.49						
Total HxCDD	ND	1.29						
Total HpCDD	ND	2.61						
Total TCDF	ND	0.678						
Total PeCDF	ND	0.751						
Total HxCDF	ND	0.857						
Total HpCDF	ND	0.554						

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Sample ID: PRICSOCLYLD-01C

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 05-May-2014 15:05

Sample Data

Matrix: Aqueous
 Sample Size: 9.90 L

Laboratory Data

Lab Sample: 1400338-01 Date Received: 07-May-2014 8:50
 QC Batch: B4E0068 Date Extracted: 20-May-2014 9:45
 Date Analyzed: 24-May-14 13:36 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.173			IS 13C-2,3,7,8-TCDD	55.2	25 - 164	
1,2,3,7,8-PeCDD	ND	0.285			13C-1,2,3,7,8-PeCDD	46.3	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.510			13C-1,2,3,4,7,8-HxCDD	36.4	32 - 141	
1,2,3,6,7,8-HxCDD	0.769			G	13C-1,2,3,6,7,8-HxCDD	39.8	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.836			13C-1,2,3,7,8,9-HxCDD	37.0	32 - 141	
1,2,3,4,6,7,8-HpCDD	13.0				13C-1,2,3,4,6,7,8-HpCDD	33.0	23 - 140	
OCDD	74.9				13C-OCDD	36.8	17 - 157	
2,3,7,8-TCDF	ND	0.179			13C-2,3,7,8-TCDF	60.2	24 - 169	
1,2,3,7,8-PeCDF	ND	0.281			13C-1,2,3,7,8-PeCDF	54.8	24 - 185	
2,3,4,7,8-PeCDF	ND	0.278			13C-2,3,4,7,8-PeCDF	53.2	21 - 178	
1,2,3,4,7,8-HxCDF	ND		0.532		13C-1,2,3,4,7,8-HxCDF	47.3	26 - 152	
1,2,3,6,7,8-HxCDF	0.560			G	13C-1,2,3,6,7,8-HxCDF	38.4	26 - 123	
2,3,4,6,7,8-HxCDF	0.402			G	13C-2,3,4,6,7,8-HxCDF	39.3	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0982			13C-1,2,3,7,8,9-HxCDF	40.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	5.81				13C-1,2,3,4,6,7,8-HpCDF	35.6	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND		0.574		13C-1,2,3,4,7,8,9-HpCDF	38.2	26 - 138	
OCDF	8.86				13C-OCDF	36.7	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	94.6	35 - 197	
TOTALS								
Total TCDD	ND	0.173						
Total PeCDD	ND	0.513						
Total HxCDD	3.00		4.08					
Total HpCDD	26.2							
Total TCDF	ND	0.205						
Total PeCDF	1.45		1.63					
Total HxCDF	6.19		6.72					
Total HpCDF	11.9		12.5					

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: PR1LDDUP-01C

EPA Method 1613B

Client Data

Name: Tierra Solutions, Inc.
 Project: Lower Passiac River Study CSO/SWO
 Date Collected: 05-May-2014 17:40

Sample Data

Matrix: Aqueous
 Sample Size: 9.99 L

Laboratory Data

Lab Sample: 1400338-02 Date Received: 07-May-2014 8:50
 QC Batch: B4E0068 Date Extracted: 20-May-2014 9:45
 Date Analyzed: 24-May-14 02:44 Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.232			IS 13C-2,3,7,8-TCDD	51.9	25 - 164	
1,2,3,7,8-PeCDD	ND	0.307			13C-1,2,3,7,8-PeCDD	47.8	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.395			13C-1,2,3,4,7,8-HxCDD	42.2	32 - 141	
1,2,3,6,7,8-HxCDD	0.652			G	13C-1,2,3,6,7,8-HxCDD	45.0	28 - 130	
1,2,3,7,8,9-HxCDD	0.419			G	13C-1,2,3,7,8,9-HxCDD	43.0	32 - 141	
1,2,3,4,6,7,8-HpCDD	10.4				13C-1,2,3,4,6,7,8-HpCDD	38.8	23 - 140	
OCDD	72.8				13C-OCDD	45.0	17 - 157	
2,3,7,8-TCDF	ND	0.129			13C-2,3,7,8-TCDF	65.2	24 - 169	
1,2,3,7,8-PeCDF	ND	0.220			13C-1,2,3,7,8-PeCDF	69.2	24 - 185	
2,3,4,7,8-PeCDF	ND	0.247			13C-2,3,4,7,8-PeCDF	68.5	21 - 178	
1,2,3,4,7,8-HxCDF	0.412			G	13C-1,2,3,4,7,8-HxCDF	60.8	26 - 152	
1,2,3,6,7,8-HxCDF	ND		0.422		13C-1,2,3,6,7,8-HxCDF	44.8	26 - 123	
2,3,4,6,7,8-HxCDF	ND		0.329		13C-2,3,4,6,7,8-HxCDF	44.2	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.159			13C-1,2,3,7,8,9-HxCDF	49.7	29 - 147	
1,2,3,4,6,7,8-HpCDF	4.14				13C-1,2,3,4,6,7,8-HpCDF	42.0	28 - 143	
1,2,3,4,7,8,9-HpCDF	0.548			G	13C-1,2,3,4,7,8,9-HpCDF	48.7	26 - 138	
OCDF	6.64				13C-OCDF	44.8	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	87.6	35 - 197	
TOTALS								
Total TCDD	ND	0.232			EMF 2/25/16			
Total PeCDD	0.318							
Total HxCDD	3.64							
Total HpCDD	22.3							
Total TCDF	ND	0.234						
Total PeCDF	0.551		1.00					
Total HxCDF	3.40		4.57					
Total HpCDF	8.58							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: PR105LDEB

EPA Method 1613B

Client Data		Sample Data		Laboratory Data		
Name:	Tierra Solutions, Inc.	Matrix:	Aqueous	Lab Sample:	1400338-03	Date Received: 07-May-2014 8:50
Project:	Lower Passiac River Study CSO/SWO	Sample Size:	9.94 L	QC Batch:	B4E0068	Date Extracted: 20-May-2014 9:45
Date Collected:	05-May-2014 16:30			Date Analyzed:	24-May-14 01:55	Column: ZB-5MS Analyst: MAS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
2,3,7,8-TCDD	ND	0.149			IS 13C-2,3,7,8-TCDD	77.2	25 - 164	
1,2,3,7,8-PeCDD	ND	0.126			13C-1,2,3,7,8-PeCDD	75.4	25 - 181	
1,2,3,4,7,8-HxCDD	ND	0.185			13C-1,2,3,4,7,8-HxCDD	65.1	32 - 141	
1,2,3,6,7,8-HxCDD	ND	0.185			13C-1,2,3,6,7,8-HxCDD	67.2	28 - 130	
1,2,3,7,8,9-HxCDD	ND	0.208			13C-1,2,3,7,8,9-HxCDD	63.0	32 - 141	
1,2,3,4,6,7,8-HpCDD	ND	0.424			13C-1,2,3,4,6,7,8-HpCDD	54.5	23 - 140	
OCDD	ND	0.486			13C-OCDD	61.0	17 - 157	
2,3,7,8-TCDF	ND	0.103			13C-2,3,7,8-TCDF	90.1	24 - 169	
1,2,3,7,8-PeCDF	ND	0.108			13C-1,2,3,7,8-PeCDF	105	24 - 185	
2,3,4,7,8-PeCDF	ND	0.114			13C-2,3,4,7,8-PeCDF	104	21 - 178	
1,2,3,4,7,8-HxCDF	ND	0.0283			13C-1,2,3,4,7,8-HxCDF	89.5	26 - 152	
1,2,3,6,7,8-HxCDF	ND	0.0365			13C-1,2,3,6,7,8-HxCDF	67.5	26 - 123	
2,3,4,6,7,8-HxCDF	ND	0.0177			13C-2,3,4,6,7,8-HxCDF	72.0	28 - 136	
1,2,3,7,8,9-HxCDF	ND	0.0239			13C-1,2,3,7,8,9-HxCDF	76.4	29 - 147	
1,2,3,4,6,7,8-HpCDF	ND	0.116			13C-1,2,3,4,6,7,8-HpCDF	61.0	28 - 143	
1,2,3,4,7,8,9-HpCDF	ND	0.0410			13C-1,2,3,4,7,8,9-HpCDF	73.4	26 - 138	
OCDF	ND	0.156			13C-OCDF	61.1	17 - 157	
					CRS 37Cl-2,3,7,8-TCDD	91.6	35 - 197	
TOTALS								
Total TCDD	ND	0.149						
Total PeCDD	ND	0.335						
Total HxCDD	ND	0.289						
Total HpCDD	ND	0.424						
Total TCDF	ND	0.103						
Total PeCDF	ND	0.275						
Total HxCDF	ND	0.0391						
Total HpCDF	ND	0.106						

Full
2/25/16

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Appendix C

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR101*

Validator: *T. Solomon*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR101

1st TCDD	25.91	An1	2.58E+02	6.49E+02	Concentration	0.137
4		An2	3.91E+02		pg/L	
Ion Ratio	0.66	Ai1	4.50E+05	1.04E+06	Reported	0.137
		Ai2	5.86E+05		pg/L	
		Vx	10.200	L (mean RRF) (pg)		
		RRF	0.898			
		Qi	2000			

Sample ID	PR101CFRB	LQ	Retention Time	PR101TLC	LQ	PR101CFFB	LQ	PR101WWFB	LQ
Concentration	0.13719		25:91	0		0		0	

Calculated Total	0.137			0		0		0	
Reported Total	0.137		ND		ND		ND		

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR102*

Validator: *T. Solomon*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR102

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.000
4		An2	0.00E+00			pg/L
Ion Ratio	0.00	Ai1	0.00E+00	0.00E+00	Reported	ND
		Ai2	0.00E+00			pg/L
		Vx	9.770	L (mean RRF) (pg)		
		RRF	1.040			
		Qi	2000			

Sample ID	PR101LPEB	LQ	PR101LPEB	LQ	PR101LDEB	LQ	PR101LDEB	LQ
Concentration	(primary)	0	(secondary)	0	(primary)	0	(secondary)	0

Calculated Total	0	0	0	0
Reported Total	ND	ND	ND	ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR105*

Validator: *T. Solomon*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR105

1st TCDD	24:30	An1	5.26E+03	1.33E+04	Concentration	0.239
4		An2	8.03E+03		pg/L	
Ion Ratio	0.65	Ai1	5.98E+06	1.29E+07	Reported	0.240
		Ai2	6.93E+06		pg/L	
		Vx	7.230	L		
		RRF	1.190	(mean RRF)		
		Qi	2000	(pg)		

Sample ID	PR1CSOCLYWW-01A	LQ	Retention Time	PR1WWDUP-01/LQ	Retention Time
Concentration	0.43979	EMPC	24:12	0.21595	22:26
	0.24003		24:30	0.1407	22:28
	0.24284	EMPC	27:02	0	2,3,7,8-TCDD
	0		2,3,7,8-TCDD		

Calculated Total	0.923	0.357
Reported Total	0.923 EMPC	0.357

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR106*

Validator: *T. Solomon*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR106

1st TCDD	24:15	An1	1.37E+05	3.09E+05	Concentration	4.34
4	5	An2	1.72E+05		pg/g	
Ion Ratio	0.80	Ai1	1.04E+07	2.35E+07	Reported	4.36
		Ai2	1.31E+07		pg/g	
		Vx	5.090	g		
		RRF	1.19	(mean RRF)		
		Qi	2000	(pg)		

Sample ID	PR1CSOCLYHP-01A	LQ	Retention Time	PR1HPDUP-01A	LQ	Retention Time
Concentration	4.3604		24:14	4.8243		24:14
	2.2034		24:33	2.1805		24:32
	0.56675		24:55	0.53726		24:55
	0.19367 EMPC		25:34	0.22122		25:33
	0.9238 EMPC		25:45	1.2751		25:46
	1.6989		25:55	1.8622		25:55
	0.68066		26:05	0.60955		26:05
	0.20107		26:18	0.19684 EMPC		26:17
	0.61858		26:25	0.68274		26:26
	0.53607		26:44	0.64745		26:44
	0.17007		26:51	0.15463		26:51
	2.3179 EMPC		27:03	2.1357		27:04
	0.15937		27:10	9.1517		27:17 (2,3,7,8-TCDD)
	2.3564		27:17 (2,3,7,8-TCDD)	0.78007		27:32
	0.63343		27:33	0.15468		27:39
	0.11811 EMPC		27:38	0.27874		28:03
	0.28658		28:04			
Calculated Total	18.0			25.7		
Reported Total	18.0 EMPC			25.7 EMPC		

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR107*

Validator: *T. Solomon*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR107

1st TCDD	21.86	An1	2.76E+02	6.69E+02	Concentration	0.207
4		An2	3.93E+02		pg/L	
Ion Ratio	0.70	Ai1	2.98E+05	6.87E+05	Reported	0.207
		Ai2	3.89E+05		pg/L	
		Vx	9.880	L		
		RRF	0.952	(mean RRF)		
		Qi	2000	(pg)		

Sample ID	PR1CSOCLYHD-01A	LQ	Retention Time	PR1HDDUP-01A	LQ	Retention Time
Concentration	0.067	EMPC	25.91	0.20687		21.86
				1.8396		25.66

Calculated Total	0.067	2.05
Reported Total	0.067 EMPC	2.05

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR109*

Validator: *T. Solomon*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR109

1st TCDD	21.75	An1	4.54E+02	1.01E+03	Concentration	6.10
4		An2	5.59E+02		pg/g	
Ion Ratio	0.81	Ai1	4.14E+05	9.41E+05	Reported	6.08
		Ai2	5.27E+05		pg/g	
		Vx	0.371	g (mean RRF) (pg)		
		RRF	0.952			
		Qi	2000			

Sample ID	PR1CSOCLYLP-01A	LQ	Retention Time	PR1LPDUP-01A	LQ	Retention Time
Concentration	6.076718		21:75	3.7474		21:73
	3.2819503		22:13	1.8904		22:15
	9.23389		25:59	1.0002	EMPC	24:09
				3.0817		25:60
				(2378 TCDD "U"		
				flagged - blank		
				1.7425	contamination)	25:83

Calculated Total	18.6	10.46
EMPC TOTAL		11.46 EMPC
Calculated total minus blank contamination		8.72
EMPC Calculated total minus blank contamination		9.72 EMPC
Reported Total	18.6	11.5 EMPC

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR110*

Validator: *T. Solomon*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR110

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.00
4		An2	0.00E+00		pg/L	
Ion Ratio	0.00	Ai1	4.37E+05	1.01E+06	Reported	0.00
		Ai2	5.68E+05		pg/L	
		Vx	9.787	L (mean RRF) (pg)		
		RRF	0.952			
		Qi	1			

Sample ID	PR1CSOCLYLD-01A	PR1LDDUP-01A	LQ
Concentration	0	0	2,3,7,8-TCDD

Calculated Total	0.0000	0
Reported Total	ND	ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR125*

Validator: *T. Solomon*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR125

1st TCDD		An1	3.66E+03	0.00E+00	Concentration	0.069
4		An2	4.08E+03		pg/L	
Ion Ratio	0.00	Ai1	8.46E+06	0.00E+00	Reported	ND
		Ai2	1.05E+07		pg/L	
		Vx	10.014	L		
		RRF	1.190	(mean RRF)		
		Qi	2000	(pg)		

Sample ID	PR103WWFB	LQ	Retention	PR108CFFB	LQ	Retention Time	PR107CFRB	LQ	Retention Time
Concentration							0.06428 EMPC		23:53
							0.10333 EMPC		TCDD

Calculated Total	0.000	0	0.168
Reported Total	ND	ND	0.168 EMPC

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR126*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b [\text{ng}])}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR126

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.000
4		An2	0.00E+00			pg/L
Ion Ratio	0.00	Ai1	0.00E+00	0.00E+00	Reported	ND
		Ai2	0.00E+00			pg/L
		Vx	10.200	L		
		RRF	1.040	(mean RRF)		
		Qi	2000	(pg)		

Sample ID

Concentration

PR103LPEB

(primary)

pg/sample

LQ

Retention Time

PR103LPEB

(secondary)

pg/sample

LQ

Retention Time

PR103LDEB

(primary)

pg/L

LQ

Retention Time

PR103LDEB

(secondary)

pg/L

LQ

Retention Time

Calculated Total

0.000

Reported Total

ND

0

ND

0

ND

0

ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR127*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR127

1st TCDD	21.66	An1	1.26E+02	2.70E+02	Concentration	0.0700
4		An2	1.44E+02			pg/L
Ion Ratio	0.88	Ai1	3.51E+05	8.07E+05	Reported	0.0700
		Ai2	4.56E+05			pg/L
		Vx	10.039		L	
		RRF	0.952		(mean RRF)	
		Qi	2000		(pg)	

Sample ID	PR108CFRB	LQ	Retention Time
Concentration	0.069987		21:66
	0.12741	EMPC	TCDD

Calculated Total	0.197
Reported Total	0.1970 EMPC

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR134*

Validator: *T. Solomon*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR134

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.00
4		An2	0.00E+00			pg/L
Ion Ratio	0.00	Ai1	3.72E+06	8.34E+06	Reported	0.00
		Ai2	4.62E+06			pg/L
		Vx	9.730	L		
		RRF	1.040	(mean RRF)		
		Qi	1	(pg)		

Sample ID	PR1CSOCLYWW-02B	PR1WWDUP-02B
Concentration	02,3,7,8-TCDD	02,3,7,8-TCDD

Calculated Total	0.000	0
Reported Total	ND	ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR135*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR135

1st TCDD	21.68	An1	2.67E+03	5.90E+03	Concentration	4.23
4		An2	3.23E+03			pg/g
Ion Ratio	0.83	Ai1	5.41E+05	1.23E+06	Reported	4.24
		Ai2	6.91E+05			pg/g
		Vx	5.002			g
		RRF	0.905			(mean RRF)
		Qi	4000			(pg)

Sample ID	PR1CSOCLYHP-02B	LQ	Retention Time	PR1HPDUP-02B	LQ	Retention Time
Concentration	4.2365		21:68	4.1949		21:66
	2.3606		22:11	0.38995		22:61
	0.58848		22:59	0.85656		23:79
	1.166		23:80	1.1727		23:97
	1.3288		24:00	0.4932		24:22
	0.55826		24:20	1.3767		25:44
	0.57161		24:64	0.19818		25:55
	1.3774		25:39	0 U		TCDD
	0 U		TCDD	0.5449		25:01
	0.58814		26:03			

1.9104 EMPC
0.469 EMPC
0.54062 EMPC

Calculated Total	12.78
EMPC TOTAL	
Reported Total	14.0

Note: 1.24 pg/g TCDD result was qualified "U" which accounts for the difference in the reported vs calculated

9.23
12.15 EMPC
13.8 EMPC

Note: 1.60 pg/g TCDD result was qualified "U" which accounts for the difference in the reported vs calculated

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR137*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR137

1st TCDD	25.78	An1	1.93E+03	4.50E+03	Concentration	1.42
4		An2	2.57E+03			pg/L
Ion Ratio	0.75	Ai1	3.04E+04	6.96E+04	Reported	1.42
		Ai2	3.92E+04			pg/L
		Vx	9.588	L		
		RRF	0.952	(mean RRF)		
		Qi	200	(pg)		

Sample ID	PR109CFRB	LQ	Retention Time	PR101HLLC	LQ	Retention Time
Concentration	0.20334	EMPC				
	1.4178		TCDD			

Calculated Total	1.62	0
Reported Total	1.62 EMPC	ND

Time

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR138*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR138

1st TCDD	23.37	An1	9.25E+03	2.04E+04	Concentration	0.28
4		An2	1.11E+04			pg/L
Ion Ratio	0.83	Ai1	6.68E+06	1.47E+07	Reported	0.28
		Ai2	8.04E+06			pg/L
		Vx	9.660			
		RRF	1.040			
		Qi	2000			

Sample ID	PR1CSOCLYHD-02B	LQ	Retention Time	PR1HDDUP-02B	LQ	Retention Time
Concentration	0.27464		23:37	0.136	EMPC	23:38

Calculated Tot:	0.275	0.136
Reported Total:	0.275	0.136 EMPC

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR140*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR140

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.00
4		An2	0.00E+00		pg/g	
Ion Ratio	0.00	Ai1	4.60E+06	1.03E+07	Reported	0.00
		Ai2	5.71E+06		pg/g	
		Vx	0.080	g (mean RRF) (pg)		
		RRF	1.040			
		Qi	2000			

Sample IDPR1CSOCLYLP-02B LQRETENTION TIMEPR1LPDUP-02B LQRETENTION TIME

Concentration

Calculated Total0.000

Reported TotalND

0

ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR141*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR141

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.00
4		An2	0.00E+00		pg/L	
Ion Ratio	0.00	Ai1	4.64E+06	1.05E+07	Reported	0.00
		Ai2	5.86E+06		pg/L	
		Vx	9.930	L		
		RRF	1.040	(mean RRF)		
		Qi	2000	(pg)		

Sample IDPR1CSOCLYLD-02B LQRetention TimePR1LDDUP-02B LQRetention Time

Concentration

Calculated Total0.000

Reported TotalND

0

ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR142*

Validator: *Elise Francken*

Date: *02/26/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR142

1st TCDD	27:02	An1	1.53E+04	3.37E+04	Concentration	0.390
4		An2	1.84E+04		pg/L	
Ion Ratio	0.83	Ai1	7.52E+06	1.70E+07	Reported	0.387
		Ai2	9.48E+06		pg/L	
		Vx	9.770	L (mean RRF) (pg)		
		RRF	1.040			
		Qi	2000			

Sample ID PR110CFRB

LQ

Retention Time PR104WWFB LQ

Retention Time PR109CFF LQ

Retention Time

Concentrat

0.38745

TCDD

Calculated

0.387

0

0

Reported T

0.387

ND

ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR145*

Validator: *Elise Francken*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR145

1st TCDD	23.18	An1	1.77E+04	4.29E+04	Concentration	0.299
4		An2	2.52E+04			pg/L
Ion Ratio	0.70	Ai1	1.25E+07	2.85E+07	Reported	0.297
		Ai2	1.60E+07			pg/L
		Vx	9.780	L		
		RRF	1.030	(mean RRF)		
		Qi	2000	(pg)		

Sample ID	PR1CSOCLYWW-01C	LQ	Retention Time	PR1WWDUP-01C	LQ	Retention Time
Concentration	0.29707		23:18	0.13803	EMPC	23:18
	0.13272	EMPC	23:42	0.081034	EMPC	26:49:00
	0.095844		25:25:00	0.053028	EMPC	TCDD
	0.1157	EMPC	26:46:00			
	0.084793	EMPC	TCDD			

Calculated Total	0.726 W EMPC	0.272
	0.393 W/O EMPC	
Reported Total	0.726 EMPC	0.272 EMPC

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR146*

Validator: *Elise Francken*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR146

1st TCDD	23:21	An1	1.85E+05	4.23E+05	Concentrat	5.75
4		An2	2.38E+05		pg/g	
Ion Ratio	0.78	Ai1	1.27E+07	2.86E+07	Reported	5.75
		Ai2	1.59E+07		pg/g	
		Vx	9.990	g (mean RRF) (pg)		
		RRF	1.030			
		Qi	4000			

Sample ID	PR1CSOCLYHP-01C	LQ	Retention Time	PR1HPDUP-01C	LQ	Retention Time
Concentration	5.7466		23:21	4.4924		23:22
	3.5062		23:45	2.5546		23:45
				0.53646		24:14:00
				0.26763		25:03:00
	1.3511		25:17:00	1.1498		25:18:00
	1.4371		25:28	1.2168		25:29:00
	0.60632		25:39:00	0.54425		25:41:00
	0.78321		26:04:00	0.19202		25:55:00
				0.70112		26:06:00
	0.21749		26:26:00	1.0379		26:49:00
	1.4701		26:47:00	0.77645		27:23:00
	0.23843		26:56:00	0.21218		27:31:00
	0 U	TCDD		0.36962		27:59:00
	0.77857		27:22:00			
	0.40893		27:57:00			
	0.48465 EMPC		24:13:00	0.46813 EMPC		26:26:00
	0.21143 EMPC		25:02:00	0.16929 EMPC		26:56:00
	0.53643 EMPC		26:26:00	1.2801 EMPC	TCDD	
Calculated Total	16.5			14.1		
EMPC TOTAL	17.8 EMPC			16.0 EMPC		
Reported Total	19.4 EMPC			16.0 EMPC		

Note:

2,3,7,8-TCDD was found in the sample @
1.60pg/g and Qualified "U" . Form 1 for
total needed corrected to account for this.

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR147*

Validator: *Elise Francken*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR147

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.00
4		An2	0.00E+00		pg/L	
Ion Ratio	0.00	Ai1	4.60E+06	1.03E+07	Reported	0.00
		Ai2	5.71E+06		pg/L	
		Vx	0.080	g (mean RRF) (pg)		
		RRF	1.040			
		Qi	2000			

Sample ID	PR1CSOCLYHD-01C	LQ	Retention Time	PR1HDDUP-01C	LQ	Retention Time
Concentration		0	TCDD	0.06836	EMPC	23:20
				0		TCDD

Calculated Total	0.000	0
Reported Total	ND	ND

0.06836	W EMPC
0.0684	EMPC

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR149*

Validator: *Elise Francken*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b [\text{ng}])}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD})(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR149

1st TCDD	23.19	An1	1.30E+04	2.79E+04	Concentration	17.521
4		An2	1.49E+04		pg/g	
Ion Ratio	0.87	Ai1	1.77E+07	4.00E+07	Reported	17.486
		Ai2	2.23E+07		pg/g	
		Vx	0.077		g	
		RRF	1.030		(mean RRF)	
		Qi	2000		(pg)	

Sample ID	PR1CSOCLYLP-01C	LQ	Retention Time	PR1LPDUF LQ	RT	PR105LPEB	LQ	RT
Concentrat		17.486	23:20	18.698		23:19		
		8.9406 EMPC	2,3,7,8-TCDD	12.184		23:44		
				11.273		25:27:00		
				10.745		26:47:00		
				15.965 EMPC		2,3,7,8-TCDD		

Calculated	26.4 W EMPC	68.9 W EMPC	0
	17.486 W/O EMPC	52.9 W/O EMPC	
Reported T	26.4 EMPC	68.9 EMPC	ND

Title: Procedure for Verification of Total Tetra Chlorinated Dibenzo Dioxin Results - Rev. 2

Author: Diane Waldschmidt 02/25/2016

SDG: *PR150*

Validator: *Elise Francken*

Date: *02/25/2016*

Purpose: The purpose of this procedure is to provide the basis for evaluation of Total Tetra Chlorinated Dibenzo Dioxin (TCDD) results. These values are not evaluated during the isomer specific data validation task. Therefore this procedure has been developed to define the process used to assess completeness and accuracy of the TCDD data set.

Limitations: This procedure was developed based on the fact that the 2,3,7,8 –substituted isomer specific data validation has already been performed. Therefore quality control criteria previously evaluated are not covered in this procedure (ex. holding time compliance, review of field chain of custody records, etc). This procedure alone is inadequate for data verification.

Procedure:

1. Verify that all necessary raw data are present to support the Total TCDD result reported.

Are selected ion current profiles (SICPs) for ions 319.8965 and 321.8936 representing all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin reported for each sample in the delivery group present in the data package?

Yes ~~No~~ ~~NA~~

Are integrated areas present for both the primary and confirmation ions for all peaks 2.5 times above background noise in each sample SICP?

Yes ~~No~~ ~~NA~~

Are instrument quantitation reports containing relative response factors for 2,3,7,8-TCDD, area counts for the 2,3,7,8 –TCDD labeled analog and sample preparation information present for each sample in the delivery group?

Yes ~~No~~ ~~NA~~

If any of the required deliverables are missing, contact the laboratory project manager to request explanation/re-submittals.

2. Verification of Total TCDD results reported for each sample.

Is the retention time of each non 2,3,7,8-substituted compound identified as present in the sample within the window established by the window defining mixture, for the tetra chlorinated homologue?

Yes ~~No~~ ~~NA~~

Is the integrated ion current of each non 2,3,7,8-substituted compound identified as present in the sample at least 2.5 times background noise?

Yes ~~No~~ ~~NA~~

Are all peaks meeting the requirements described above included in the laboratory's calculation of Total TCDD?

Yes ~~No~~ ~~NA~~

Choose a minimum of one non 2,3,7,8-substituted compound identified and verify by recalculation the concentration found using the integrated area responses of the two characteristic ions identified on the SICP and the following equation: ***See attached calculation page.***

$$\frac{(\text{area of analyte}^a)(\text{labeled analog}^b \text{ [ng]})}{(\text{RRF}^c)(\text{area of labeled 2,3,7,8-TCDD}^a)(\text{sample extracted [g]})}$$

^a Combined area of M1 and M2 ions

^b Amount of labeled 2,3,7,8-TCDD in extract

^c RRF for 2,3,7,8-TCDD native

Calculate the sum of all non 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxins and 2,3,7,8-substituted tetra chlorinated dibenzo-p-dioxin identified in each sample. Compare result obtained with that found on the Form 1. ***See attached calculation page.***

Notes:

Non-detect results for individual components are not included in the total TCDD value. In these cases "zero" concentration is contributed to the summed total TCDD result.

Results flagged as Estimated Maximum Possible Concentration (EMPC), when present for any one or multiple individual component isomers, were included numerically in the summed total TCDD result. However, the final total TCDD result in these cases was also qualified as an EMPC.

No other data qualifiers were included or considered in the summation of individual component concentrations or the resulting total TCDD value.

Results flagged "R", rejected, are not used/included in the calculation of total TCDD.

Were any errors found?

~~Yes~~ No ~~NA~~

If any errors are found, contact the laboratory project manager to request explanation/re-submittals.

PR150

1st TCDD		An1	0.00E+00	0.00E+00	Concentration	0.000
4		An2	0.00E+00			pg/L
Ion Ratio	0.00	Ai1	0.00E+00	0.00E+00	Reported	ND
		Ai2	0.00E+00			pg/L
		Vx	9.770	L (mean RRF) (pg)		
		RRF	1.040			
		Qi	2000			

Sample ID

PR1CSOCLYLD-01C

LQ

0

Concentration

Rention Time

PR1LDDUP-01C

LQ

0

TCDD

Rention Time

PR105LDEB

LQ

TCDD

Rention Time

Calculated Total

0.000

Reported Total

ND

0

ND

0

ND